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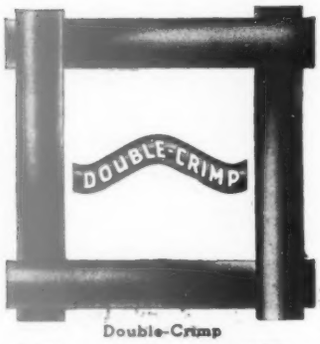
PIT AND QUARRY

AUGUST, 1945

TOTAL NET PAID CIRCULATION NOW AT NEW ALL-TIME PEAK — OVER 7,500

FOR 28 YEARS THE LARGEST PRODUCER CIRCULATION IN THE FIELD

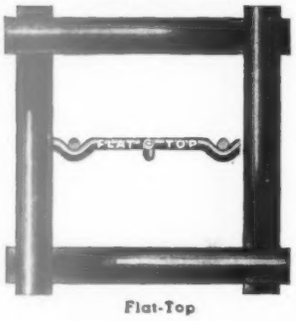
SEP 16 1945



Double-Crimp

Arch-Crimp

Intermediate-Crimp



Flat-Top

"The Perfect"

Wire Cloths and Screens

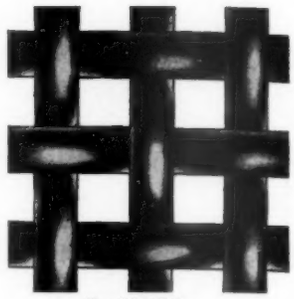
We have been specialists for many years in the making of precision wire cloths, wire screens and woven wire products.

We apply our same precision principles in fabricating wire cloths into finished industrial units, for production or processing equipments or for permanent parts of countless industrial products.

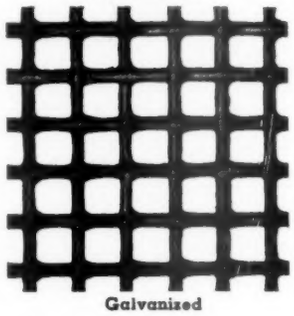
We invite your inquiries for wire cloths of all commercial metals or alloys or weaves, in continuous lengths or cut to size, or processed to meet your individual requirements.

"Perfect" alloys and metals	"Perfect" Wire Cloth weaves	"Perfect" Wire Cloth Processing	"Perfect" Wire Cloth products
Super-Loy	Arch-Crimp	Bending	Baskets
Steel	Coiled	Binding	Circles
Galvanized	Double-Crimp	Brazing	Cones
Tinned	Double-Fill	Calendering	Crates
Stainless Steel	Dutch	Clinching	Cylinders
Nickel-Chromium alloys	Filter	Cutting	Discs
Aluminum	Flat-Top	Dipping	Forms
Brass	Herringbone-Twill	Dishing	Leaves
Bronze	Intermediate-crimp	Flanging	Lengths
Commercial Phosphor	Rek-Tang	Flattening	Panels
Copper	Selvage-Edge	Forming	Pieces
Monel Metal	Straight-Warp	Framing	Racks
Nickel	Stranded	Galvanizing	Ribbons
Any special alloys available in rod or wire form	Sta-Tru	Painting	Rolls
	Triple-Warp	Shearing	Sections
	Twilled	Slitting	Segments
	Twisted-Fill	Trimming	Spaces
	Twisted-Warp	Arc-Welding	Strips
		Gas-Welding	Template shapes
		Spot-Welding	Trays

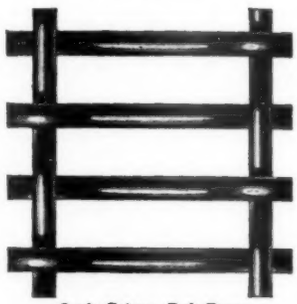
We will follow your specifications and blue-prints exactly as your production engineers have prepared them—or we will submit suggestions for your approval.



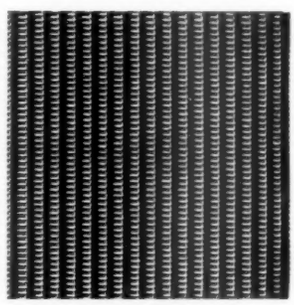
Double-Crimp



Galvanized



Arch-Crimp Rek-Tang

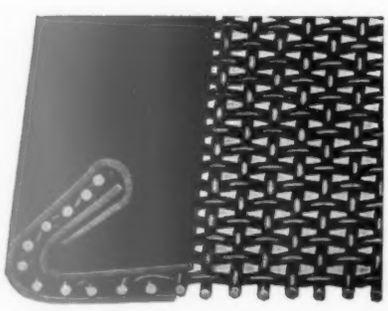


Dutch Weave

The LUDLOW-SAYLOR WIRE COMPANY

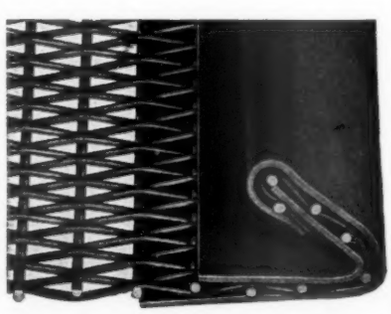
Newstead Avenue & Wabash Railroad

ST. LOUIS 10, MO.



LUDLOW-SAYLOR PRECISION FABRICATING makes vibrating-screen decks and jackets that are easily handled — quickly installed — need fewer adjustments and renewals.

Illustrations suggest only a few of the many available types of wire cloths and woven wire screens, which may be custom-finished with attachments to fit your particular processing installations.



LINK-BELT ELEVATORS and CONVEYORS

APRON • BELT • BUCKET • SCREW AND FLIGHT TYPES

MOVE MATERIALS IN MODERN MAGNESIUM PLANT

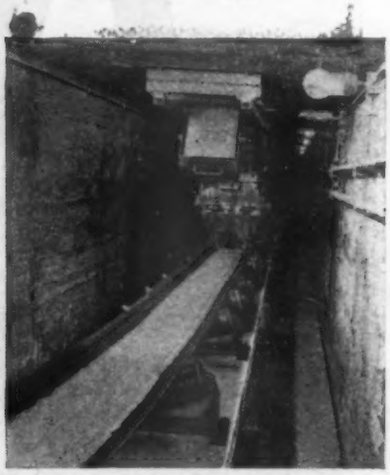
IN these days, industry's production is figuratively on wings as products for war and civilian use pour out. So it is at the New England Lime Company's Canaan, Connecticut plant with a capacity of 15 tons of magnesium metal daily.

It is significant that, in keeping up a flow of raw materials through the crushing, calcining, and mixing stages, up to the briquetting machines, LINK-BELT Elevators and Conveyors are used throughout.

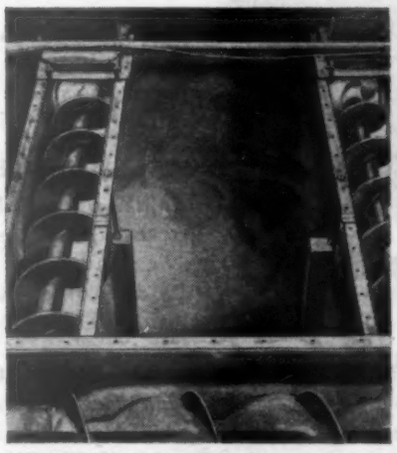
The pictures show a few of the installations. There are many others.

In your planning for tomorrow, consult Link-Belt on materials handling, preparation and power transmission machinery, to help increase production efficiency, improve quality, reduce costs. Write today!

LINK-BELT #778 continuous steel bucket elevator, 48′ centers handling dolomitic limestone from gyratory crusher to screen at 80 T. P. H. Extra chute to elevator extends from a hammermill located under screen.



View under 1500-ton capacity storage bin showing minus #6 mesh dolomitic limestone being reclaimed to LINK-BELT 16″ wide, 100′ long belt conveyor, capacity 15 T. P. H.



LINK-BELT 9″ dia. Helicoid (screw) conveyors from rotary coolers to two L-B bucket elevators, handling calcined lime. Two bottom conveyors are each 70 ft. long.

LINK-BELT 4′ centers steel apron feeder under R. R. track hopper delivering coal to LINK-BELT 24″ wide, belt conveyor feeding ring crusher. Capacity 25 T. P. H.

Hardenbergh Photos.

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in principal cities.

9041

MATERIALS HANDLING AND CONVEYOR EQUIPMENT

Engineered, Built and Backed by LINK-BELT

PIT AND QUARRY, August, 1945. Vol. 38, No. 2. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago 5, Ill. Subscription price $2 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 25 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1897.

What makes this Upson-Walton Oval Steel Block a Better Block?

Upson-Walton oval steel blocks for use with Manila rope are specifically engineered to give maximum service under actual operating conditions. Check these features that make Upson-Walton oval steel blocks *better* blocks!

STEEL SHELLS ARE ALL FLANGED to prevent the rope from chafing against the sides; lengthens operating life of the rope.

SHEAVES ARE MADE FROM CLOSE-GRAINED GREY IRON, hence they are stronger. Closely inspected to exclude all blow-holes, pits and other weakening inclusions.

SHEAVE RIM AND CENTER PIN ARE CONCENTRIC. Center pins are made of cold rolled steel. Unusual care is taken to insure true-running sheaves. Close tolerance between sheave bearing and center pin results in longer life for the bearing.

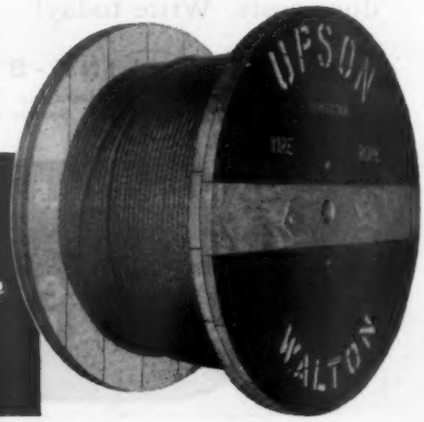
STURDY STEEL STRAPS are securely riveted to the shell assembly producing a more rigid block.

HEAVIER DROP-FORGED HOIST HOOKS . . . *not the usual and weaker round stock type, but specially-designed, heavy-duty hoist type as used on cranes and heavy equipment. Permits greatly increased safe working loads.*

AS WE GO TO PRESS, DELIVERIES ON UPSON-WALTON OVAL STEEL BLOCKS ARE GOOD

Established 1871

All Upson-Walton oval steel blocks are furnished complete with becket.



THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

114 Broad Street, New York 4 — 737 West Jackson Boulevard, Chicago 6 — 241 Oliver Building, Pittsburgh 22

BEST TIRE for bruising mine and quarry service is the time-proved Goodyear Hard Rock Lug — first choice wherever the going is toughest. And best proof of that is the fact that off-the-road as on highways, more tons are hauled on Goodyear truck tires than on any other kind! To reduce your tire troubles and expense, take a tip from this performance preference and equip with Hard Rock Lugs — standouts in stamina on rugged service operations.

BUY WAR BONDS ★ BUY FOR KEEPS

HERE ARE THE REASONS WHY:

MASSIVE LUG BARS armor the tread and sidewalls against cutting

SELF-CLEANING TREAD doesn't pack up, bites deeper, pulls better

EXTRA-THICK UNDERTREAD lengthens tire life—protects carcass from bruises

SUPERSTRONG CARCASS of Goodyear's patented Rayotwist Cord—made from rayon—adds more stamina, long life

MULTIPLE BEADS of high tensile steel wire insure non-slip anchorage to rim

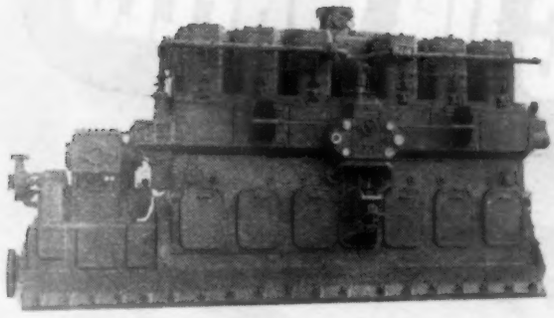
Rayotwist—T. M. The Goodyear Tire & Rubber Company

GOODYEAR

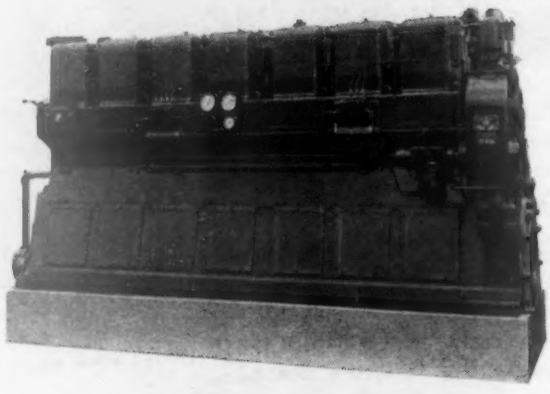
THE GREATEST NAME IN RUBBER

COOPER-BESSEMER ENGINES

For Stationary, Marine, and Locomotive Power



Four-cycle Type LS direct-reversing marine Diesel engine, built in 6, 7, and 8 cylinder sizes, rated 525 to 1250 horsepower. Supercharging, available for all Cooper-Bessemer Diesels, offers from 30 to 50 percent increase in horsepower.



Four-cycle Type JS engine, easily converted from Diesel to gas operation, or gas to Diesel. Available in 6, 7, and 8 cylinder units rated from 65 to 116 hp per cylinder depending upon speed and application.

Cooper-Bessemer heavy-duty Diesel and gas engines are built in different types from 50 to 1600 horsepower for electric generating service and for direct-connected power drives of virtually every description. These modern engines lead the way in high efficiency, low upkeep and reliability due to such advanced engineering features as full-pressure lubrication, oil-cooled pistons, precision-type bearings, Meehanite Metal castings, and controlled-pressure Diesel fuel injection. Detailed information will be gladly furnished on the proper engine for any installation.

The Cooper-Bessemer Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

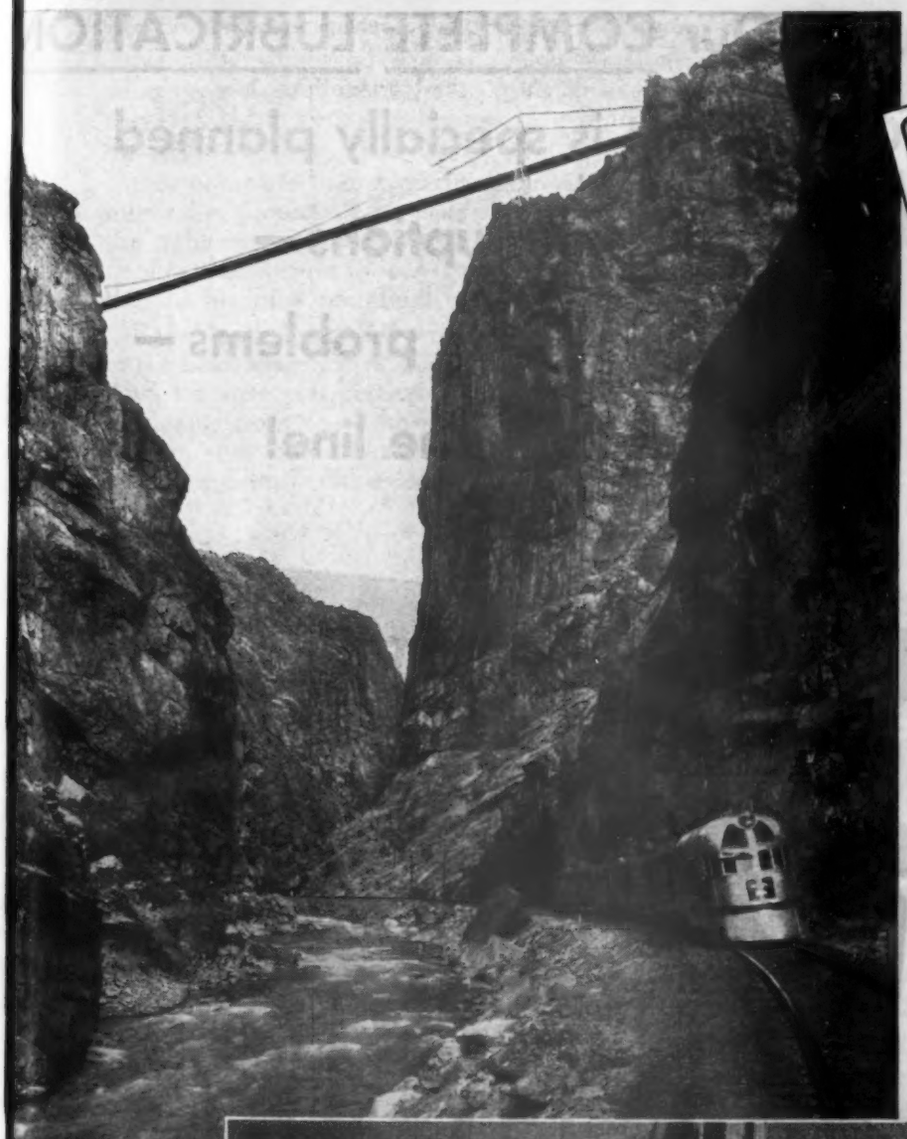
New York Washington Gloucester Houston Dallas Los Angeles
San Francisco Seattle Tulsa Shreveport Calmes Engineering Co., New Orleans

build better RAILROADS

. . . with Ballast from a Cedarapids Master Tandem

Rebuilding the roadbeds of the nation's railroads after the war years' forced neglect will require millions of tons of aggregate. Much of this work must be done in remote sections of the country so that it will be more advantageous to take the crushing plants to the jobs. That's why the portability and high capacity of Cedarapids Master Tandems are so important. With a Cedarapids Primary unit ahead of it, the Master Tandem reduces big rock to uniform ballast size in a continuous flow, smoothly and economically. The entire plant is on wheels and can be moved easily from one job to the next without delay. Every part is designed and built to stand up under the hardest use with only a minimum of maintenance.

Whatever your requirements for aggregate producing or asphalt mixing equipment for tomorrow's construction jobs you'll find your best source of supply in Iowa's complete line. See your local dealer or write.



Cedarapids Built by IOWA

THE IOWA LINE

of Material Handling Equipment Includes

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS—STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS—TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

IOWA MANUFACTURING CO.

Cedar Rapids, Iowa

PAYS OFF IN

You get far more than oils and greases from Socony-Vacuum. Our COMPLETE LUBRICATION SERVICE for Contractors is specially planned to save you costly interruptions — minimize inventory and service problems — ease pressure all along the line!

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates:
Magnolia Petroleum Co., General Petroleum Corp. of Calif.

TIME SAVED!

"MORE hauls per hour"..."more yardage or tonnage moved"..."fewer delays, fewer interruptions on the job"—these are the kind of results this new Socony-Vacuum service is designed to give you.

No matter what kind of job you're on—no matter what type of equipment you're using, this service can be fitted to your specific needs...can give you *many* time savings.

Our complete line of quality lubricants assures maximum protection for every machine—*exactly* the right oil or grease no matter how unusual the application! Result: fewer breakdowns—more continuous machine operation.

Reliable on-the-job deliveries save precious hours in the field, spare you needless inventory problems. And, because you get even the most specialized lubricants from *one* convenient source, you save time in your office. No more bother with special orders or extra bookkeeping.

Your Socony-Vacuum Representative is an expert in analyzing and solving time-losing maintenance and equipment problems. He'll help your men adapt the latest field-tested maintenance schedules to your needs—instruct "green help" on Correct Lubrication—call in engineering aid when needed.

When you buy from Socony-Vacuum, you get much *more* than fuels and lubricants! Out on the job—in the maintenance department—all through your operation, Socony-Vacuum's Complete Service for Contractors SAVES TIME!

"ON YOUR STAFF—BUT NOT ON YOUR PAYROLL"—
Your Socony-Vacuum Representative

CORRECT LUBRICATION FOR EVERY PART OF EVERY MACHINE YOU OPERATE...
PLUS
1 ENGINEERING HELP on time-losing operating problems; 2 TESTED MAINTENANCE SCHEDULES that minimize service man-hours—keep equipment on the job;
3 PROMPT, DEPENDABLE DELIVERY—a reliable, on-the-job service that eliminates inventory problems for you!

"INFORMATION PLEASE" returns from vacation September 10. Until then, hear Rise Stevens and Hollywood Music—Mondays 9:30 P. M., E. W. T., NBC

CORRECT *for connecting rods*

Loose connecting rod bearing caps can be a source of serious trouble. Protect yourself — apply Elastic Stop Nuts; they hold fast. This, or any other nut, won't stop bearing wear or bolt stretch, but it can remedy connecting rod troubles resulting from loose nuts.

Make certain that the bolt extends completely through the collar.

THIS NUT ALWAYS HOLDS FAST

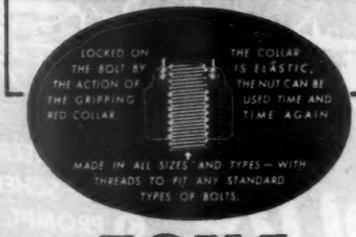
Under tough operating conditions, on connecting rod bearings for instance, the Elastic Self-Locking Stop Nut does its job, by gripping fast. An ordinary castellated nut or jam nut might break loose, lose its grip and fail, and so would the parts it is assigned to hold together.

But not the Elastic Stop Nut. It uses its head—for, built into the head of this nut is a locking device, an oil-resistant elastic compression collar. This forms itself to the individual bolt thread, grips it tight. The nut won't loosen or back off under the severest vibration, shock or impact.

You need no cotter pins, no lock-washers or other auxiliaries when you use Elastic Stop Nuts. Thus there is no possibility of broken bits of these extras in the crankcase. Nor is there any distortion of or damage to the bolt or the cap. Made to fit any standard bolt or stud, Elastic Stop Nuts can be used over and over again with fully adequate gripping power. You can turn this nut up to the exact torque you need and be sure it will stay there.

Here is definite insurance against loose bearing caps which means greater safety and reliability in use; greater economy in assembly and maintenance.

LOCKS FAST TO MAKE THINGS LAST


LOCKED ON THE BOLT BY THE ACTION OF THE GRIPPING RED COLLAR
THE COLLAR IS ELASTIC, THE NUT CAN BE USED TIME AND TIME AGAIN
MADE IN ALL SIZES AND TYPES — WITH THREADS TO FIT ANY STANDARD TYPES OF BOLTS

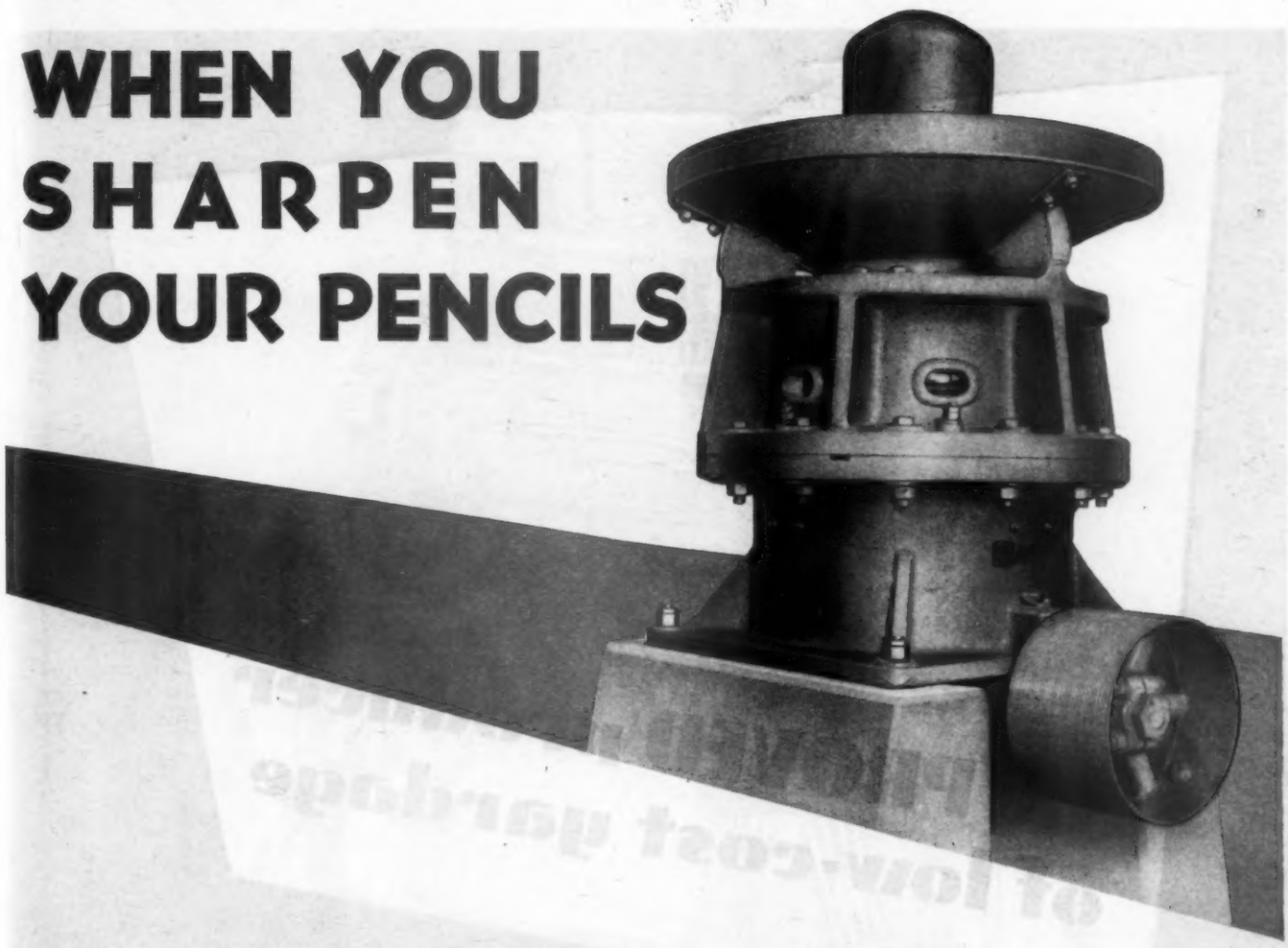
ESNA
TRADE MARK

ELASTIC STOP NUT CORPORATION OF AMERICA

Plants at: Union, New Jersey and Lincoln, Nebraska

Sales Offices: 1060 Broad St., Newark 2, New Jersey

WHEN YOU SHARPEN YOUR PENCILS



and begin to figure on ways to increase production, be sure to include the Traylor Multi-Stage Fine Reduction Crusher in your plans. It is an exceptional machine that is outstanding in its field and will fit into your plans admirably well.

In effect it is 2 machines in 1—the upper stage crushes and sizes the material properly for . . . the lower stage where the fine crushing is done.

It is easy to adjust both stages so that production of the crusher is always kept at its highest efficiency.

It will not pack or choke at any setting because the crushing elements are the patented Traylor Bell Head and Curved Concaves.

It is automatically lubricated and effectively protected against dust and grit—also against breakage by tramp iron.

The Multi-Stage Fine Reduction Crusher is built in a range of sizes that make it widely applicable where a fine product is required in large capacity.

Ask our representative to call and discuss this machine with you or write for Bulletin 1113 for more details of this machine.

WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

TRAYLOR

ENGINEERING & MANUFACTURING CO.

MAIN OFFICE AND WORKS — ALLENTOWN. PENNA., U.S.A.

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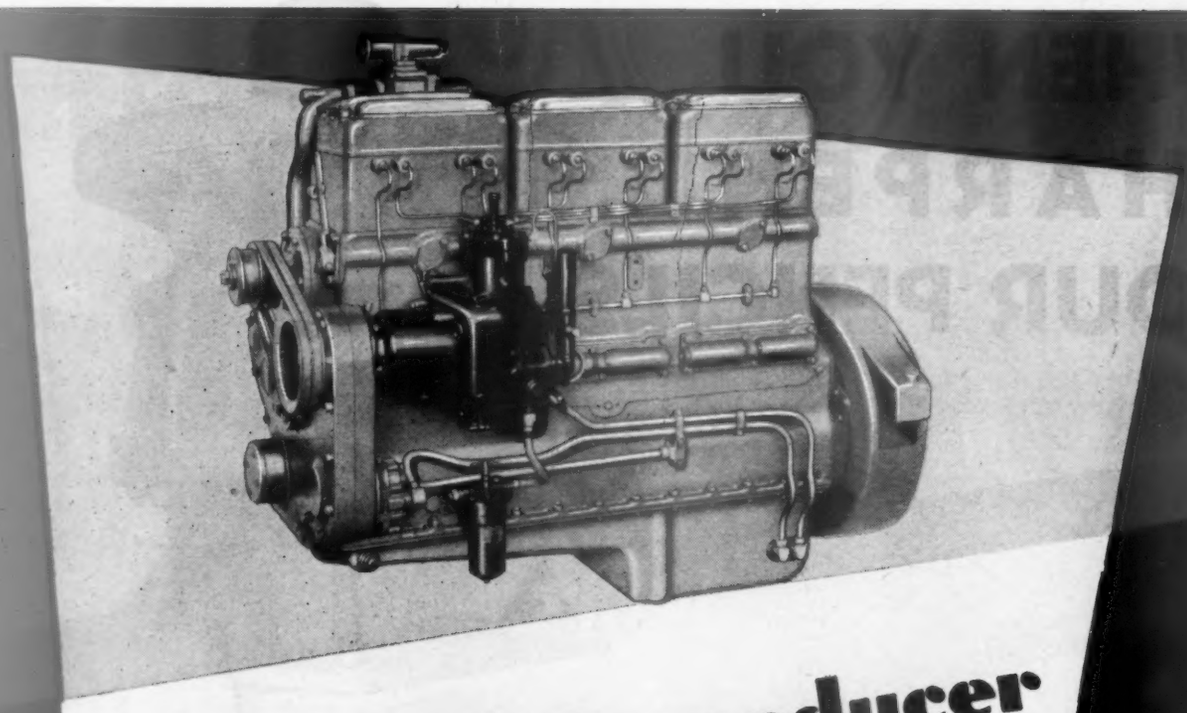
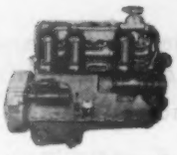
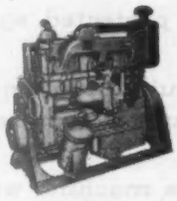
Export Department—104 Pearl St., New York City. Foreign Sales Agencies: London, Lima, Rio de Janeiro, Buenos Aires, Santiago, Antofagasta, Oruro, Montevideo, La Paz



The PROVED producer of low-cost yardage



Model HB-600: Automotive engine, 6 cylinders, 4⅞" x 6", 150 hp. at 1800 rpm. (maximum).



Model NHI-600: Power unit, 6 cylinders, 5⅛" x 6", 200 hp. at 2100 rpm. (maximum).

Model NHPS-600: Supercharged power unit, 6 cylinders, 5⅛" x 6", 275 hp. at 2100 rpm. (maximum).

The line of Cummins Dependable Diesels includes automotive, portable, stationary and marine models—50 to 275 hp.

In choosing the power for your new earth-moving and material handling equipment, make sure that you get a *proved* producer of low-cost yardage. That Cummins Diesel power is such a producer—a producer of *faster, cheaper* yardage—has been demonstrated by its 12-year performance record in trucks, shovels, draglines, dredges, compressors, rock-crushers and virtually every other type of portable or stationary application. As a result, Cummins Dependable Diesels are now standard with successful contractors and aggregates producers everywhere . . . are offered as standard or optional power by leading construction equipment manufacturers.

CUMMINS ENGINE COMPANY, INC., Columbus, Indiana

CUMMINS Dependable DIESELS

SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

"Penny-Wise and Pound-Foolish" is bad practise in blasting, too!

When it comes to blasting, today's operators know that it's false economy to be thrifty in small matters and wasteful in big ones. They realize that the cost of explosives is small when measured in terms of the final cost of moving rock. They know that true saving is a matter of *selection* and application—that you can't wisely buy explosives on price alone.

Over-all blasting economy comes from the use of the right explosive in the right place, in the right amount. It takes into account such factors as the shovel, haulage, the crusher and secondary blasting. It cuts down delays and idle hours.

Savings such as these often begin with an Atlas explosive—an explosive selected from the Atlas family of 120 kinds and grades. Call in the Atlas Representative. He can often help produce real operating economies.

Good Blasting Makes Money
Poor Blasting Loses Money

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

On Fine Reduction Crushing

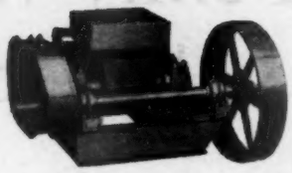
Up to 8 times more production

with Pioneer Roll Crushers

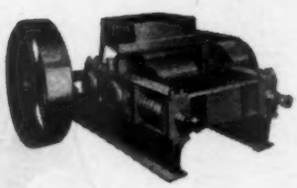
● To lower the costs of secondary crushing still further, more and more operators are installing Pioneer Roll Crushers because they deliver more on every score. They deliver small materials, in large quantities, at high speeds and at low production costs.

Power cost per yard of output is much lower than that of any other type of crushing. It is estimated that you get up to 8 times more production from your investment in manganese crushing surface when you use roll crushers because 100% of the shell area is at work and producing, and the wear is evenly distributed over the entire surface of the shell. Compare this to other types of crushers where only 10% to 20% of the manganese surface does all the work, all the fast wearing out.

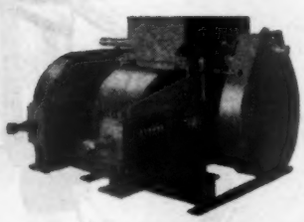
What other operators are doing with Pioneer Roll Crushers is information that interests every man considering secondary crushing. We'll be glad to place these records before you—give you the benefits of Pioneer's experience in selecting roll crushers that fit your needs completely.



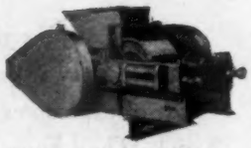
Pioneer 16" x 16"



Pioneer 24" x 16"



Pioneer 30" x 18"



Pioneer 40" x 22

Pioneer 54" x 24"

Plan with **Pioneer**

FOR PROFITABLE PRODUCTION

Pioneer

ENGINEERING WORKS

Jaw Crushers, Roll Crushers, Screens, Conveyors, Feeders, Washers

MINNEAPOLIS 13, MINNESOTA

ENGINEERS AND MANUFACTURERS OF QUARRY GRAVEL AND MINING MACHINERY

These will always win for you

I-R WAGON DRILLS • JACKHAMERS • DRIFTERS • PAVING BREAKERS • PORTABLE COMPRESSORS

Deep-hole drilling power and unusual flexibility result from using FM-2 Wagon Mountings equipped with the sturdy X-71WD Drill.

More feet of hole per shift from I-R Jackhamers, with their easy holding, high drilling speed and durability. There is a size and type for every drilling problem.

Record-breaking performance on tunnel jobs prove the durability and drilling speed of I-R Power-Feed Drifters—3, 3½ and 4-inch sizes.

You break concrete faster with I-R Paving Breakers. The popular "Cushioned-Air" feature prevents the piston from hitting the fronthead. There's less shock, less breakage, and lower upkeep. Made in 40, 60, and 80-pound sizes.

You get Air Power at lower cost from the Mobil-Air Compressor—the portable with the Drill-More Regulator—sizes 60 to 500 cubic feet per minute.

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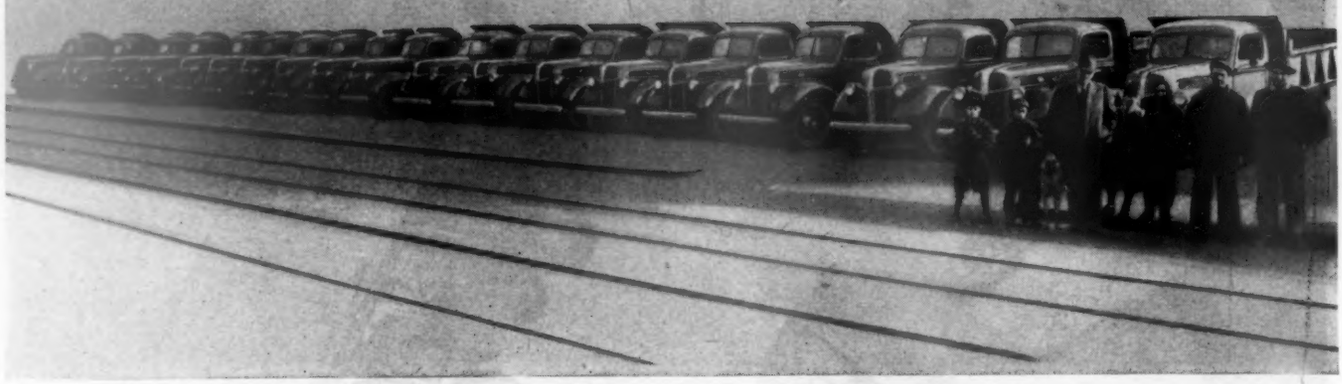
MORE FORD TRUCKS ON THE ROAD • ON MORE JOBS • FOR MORE GOOD REASONS

TRUCK-ENGINEERED **Stamina!**



"30 Tough Months Without a Breakdown"

DAY AFTER DAY, in severest service, Ford Trucks are displaying the ruggedness and efficiency which have made them the most widely used trucks in America.

Here's what Joseph D. Anthony, operator of a stone products hauling business in Providence, R. I., writes:

"Our 26 Ford Dump Trucks have been hauling sand, gravel, etc., 24 hours a day on three shifts for 30 months without let-up. Except for minor adjustments, we haven't lost an hour due to breakdowns. All trucks are in excellent condition and still doing the job."

There's only one way to make trucks perform like that—and that's by building *stamina into* them—and that's how Ford Trucks are built. Check the list of Ford features and you'll *know* this is true. And remember—when repairs are needed, Ford parts and service are readily available, economically priced.

Ford Trucks are available now, in limited quantities, for essential civilian use. See your Ford Truck Dealer without delay.

Ford

FORD ADVANCED TRUCK ENGINEERING

More Economy • More Endurance Easier Servicing

A STILL GREATER 100 HP V-8 ENGINE with NEW Ford steel-cored Silvaloy rod bearings, more enduring than ever in severe service • NEW aluminum alloy cam-ground pistons with 4 rings each, for oil economy • BIGGER, more efficient oil pump and IMPROVED rear bearing oil seal • NEW rust-proofed valve springs • NEW efficiency in cooling • in carburetion • in lubrication • Far-reaching ADVANCEMENTS in ease and economy of servicing operations.

IMPORTANT FORD CHASSIS ADVANTAGES: Easy accessibility for low-cost maintenance • Universal service facilities • Heavy-duty front axle • Extra-sturdy full-floating rear axle with pinion straddle-mounted on 3 large roller bearings • 3 axle ratios available • 2-speed axle available at extra cost • Powerful hydraulic brakes, exceptionally large cast drums • Long-lived needle bearing universal joints • Rugged 4-speed transmission with NEW internal reverse lock.

FORD TRUCKS

AND COMMERCIAL CARS

TRUCK-ENGINEERED • TRUCK-BUILT • BY TRUCK MEN

MANHATTAN CONVEYOR BELTS

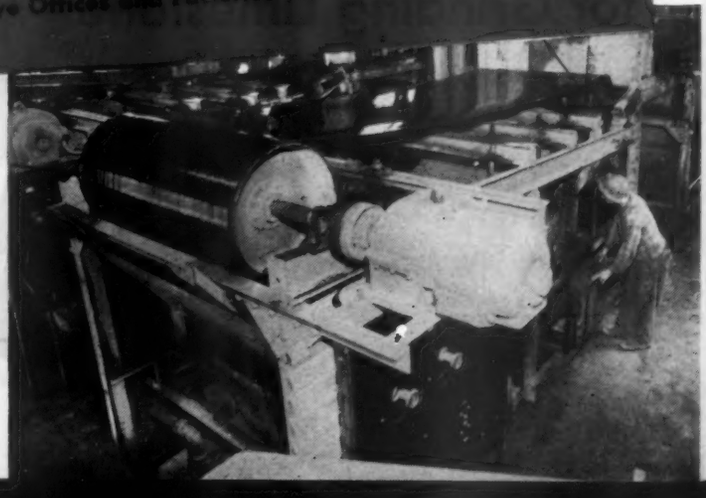
For more than 200 years, the Mt. Hope Mine at Wharton, N. J., oldest in the country and a supplier of ore for George Washington's armies, with perhaps the deepest perpendicular iron mine shaft in the world, has been producing high-grade magnetite ore.

Today the mine has been mechanized, a new and modern preparation plant has been erected with over 4,000 feet of MANHATTAN Conveyor Belt installed throughout to help in an annual production now estimated at 400,000 tons.

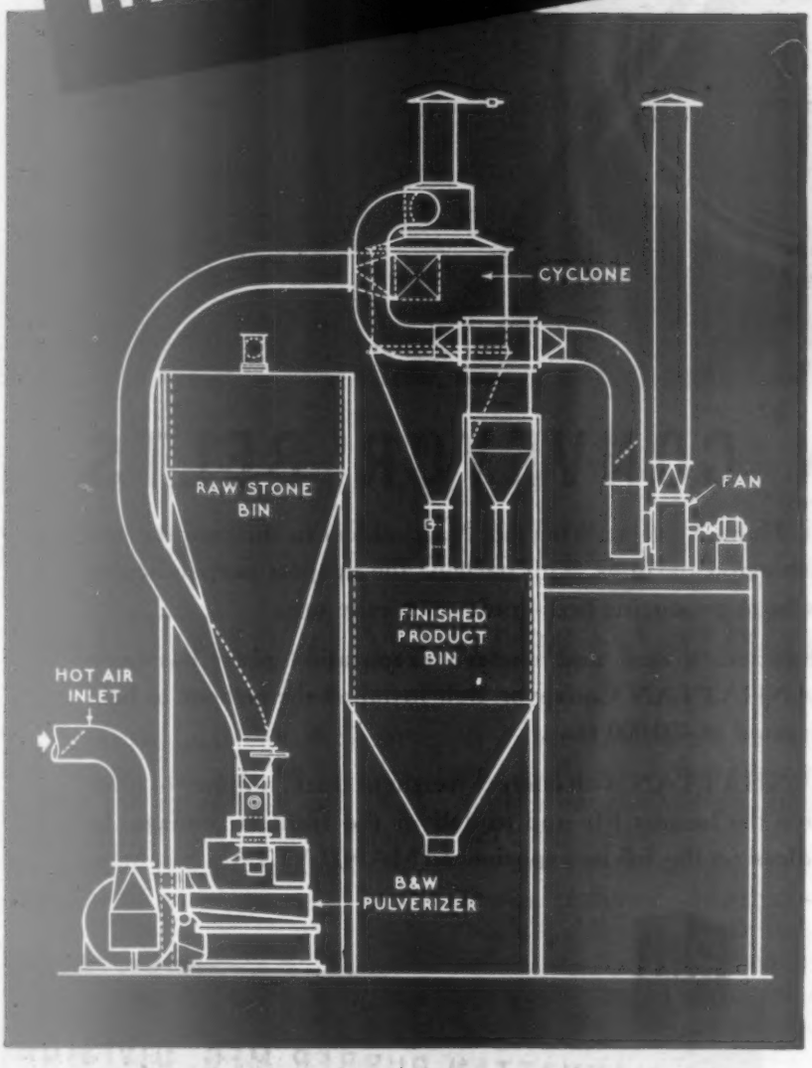
Every belt was engineered by MANHATTAN with correct weight of duck, number of plies and thickness of cover used to give the longest life and to deliver the greatest tonnage. In addition, every belt was made endless on the job by experienced MANHATTAN belt men.

Below—Skip Hoist with RAYBESTOS-MANHATTAN Brake Blocks as original equipment.

Right—MANHATTAN BELTS on Davenport-type wet magnetic separators.



BLUEPRINT for economical limestone grinding



Substantial savings in power and maintenance can be effected in the grinding of limestone by the use of Babcock & Wilcox Pulverizers.

Material handled flows through the mill in a thin, evenly distributed layer. Fines are discharged quickly, and are prevented from accumulating and interfering with the pulverizing operation. Each ball, co-acting with the grinding ring, works effectively over its entire travel, with the grinding pressure applied directly to the material—and to the minimum amount of material at a time. Result is efficient operation at low cost for power.

The large output of the B&W Pulverizer is due to the speed with which material passes through the mill, the plurality of grinding zones, and its positive grinding action. Provision can be made for drying within the system, if desired.

B&W System for Grinding Limestone

BABCOCK & WILCOX

85 LIBERTY STREET NEW YORK 6, N. Y.

Fireworks ON WHEELS

Marine fireworks on bloody Iwo Jima, as pyramids of projectiles rain death on Japanese emplacements. Rocket launchers are mounted on International four-wheel-drive trucks.
—Official U. S. Marine Corps Photo by S/Sgt. Rex M. Robbins.

AMERICA bounced back hard in this war against the Japs, and the boys who led the rebound were *United States Marines.*

From Guadalcanal to Okinawa the Marines have proved that boys from Kokomo, the Ozarks and the Bronx—when steeped in Marine Tradition, skilled with Marine training—are doggone good fighters. On beachhead after beachhead—then in jungle after jungle—they were far outnumbered by the Japs. But not outfought!

On they go, those Marines, on land and sea and in the air . . . outsmarting, outshooting, outkilling the enemy . . . till the Japs say "Uncle."

They have good equipment, sure. Most of the thousands of trucks they use, for example, are International four and six-wheel-drive military type vehicles built especially for the Marine Corps.

But proud as we are that Harvester has been able to make equipment rugged enough to fight with the Marines, we know that the real fighting machine in this march to Tokyo is the Marine himself. What a machine! All speeds forward . . . none reverse. Tough . . . rugged . . . smart. A superlative fighter. A superb citizen.

We proudly salute the boys from Kokomo, the Ozarks and the Bronx, who are *fighting* up to their glorious motto—Semper Fidelis.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

The War Bonds You HOLD Are FIGHTING BONDS . . . Support the Mighty Seventh War Loan

INTERNATIONAL *Trucks*

in the exact type to meet your specific needs

—ATTRACTIVELY PRINTED—

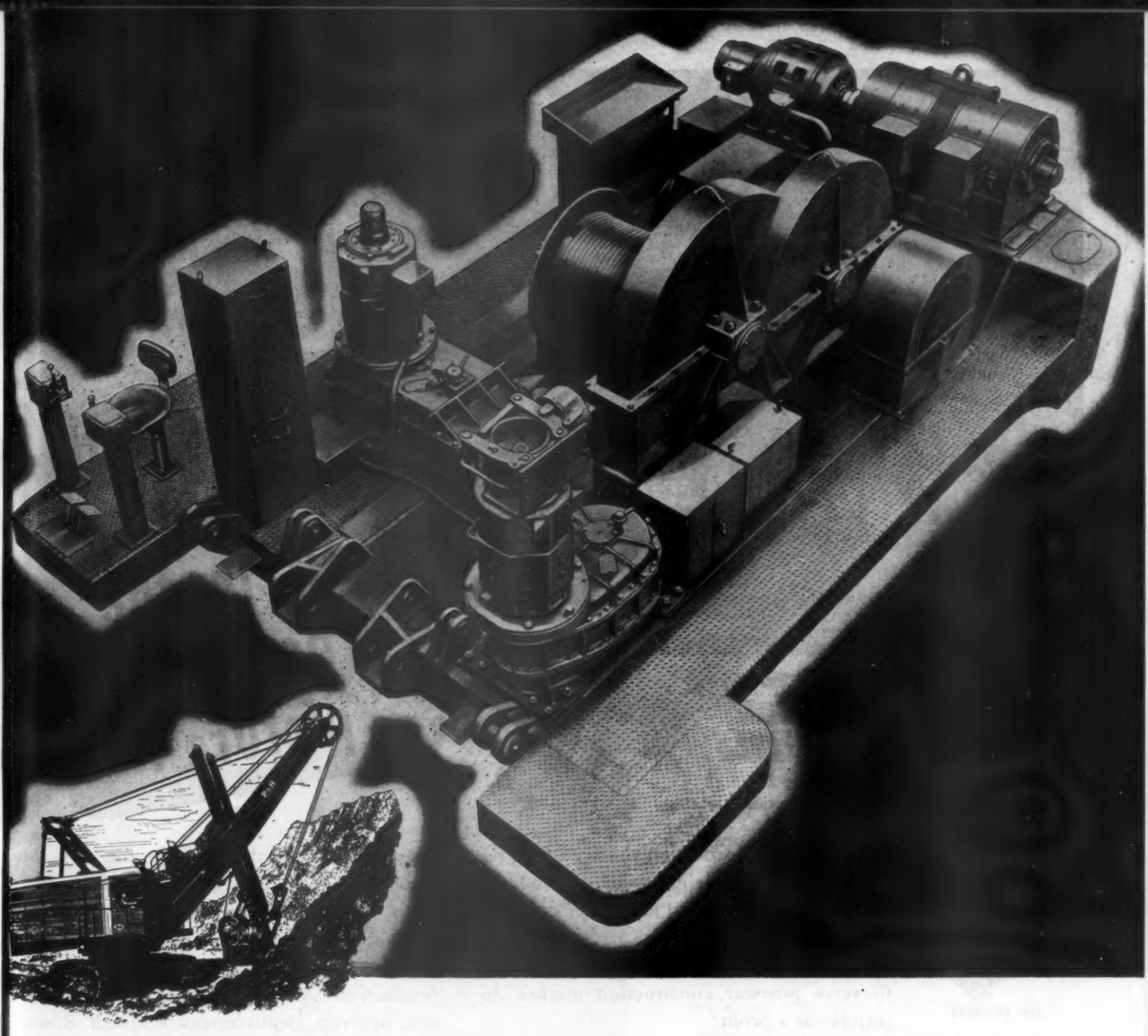
HAMMOND *MULTI-WALL* BAGS

The exigencies of a wartime economy have established the utility of *Multi-Wall Bags* for packing many new products. They have *proved* themselves under the most severe shipping conditions.

Multi-Wall bags are the most practical, economical and sanitary packages available for shipment of heavy products needing complete protection.

HAMMOND BAG & PAPER COMPANY

Paper Mill and Bag Factory — Wellsburg, W. Va.



Giving Kilowatts a New Incentive

● This is the machinery deck of the new P&H Electric Shovel—the simplest, most efficient, most modern arrangement yet devised.

But this is only an outward indication of one of its most vital qualities — *higher electrical efficiency.* This is no assembly of electrical equipment gathered from the open market. All electrical units are *designed* and built by P&H for one specific purpose — dependable digging. And each unit is built to meet its service requirements *exactly.*

Simplification has eliminated the need for contactors and contactor control cabinets — electric wiring has been reduced more than 40%. And, since all equipment on the machinery deck remains in place during shipment, there is no opportunity to "botch up" wiring or circuit connections.

This finer electrical system is the result of P&H's sixty-year leadership in applying electrical power to the movement of heavy loads. Bulletin X-83 describes it.

P&H

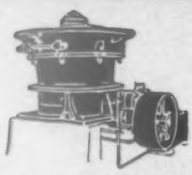
ELECTRIC SHOVELS

4451 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS | P&H | HOISTS • WELDING ELECTRODES • MOTORS

THE GREATEST FORWARD STEP EVER MADE IN ELECTRIC SHOVEL DEVELOPMENT


PRIMARY BREAKERS

GYRASPHERE SECONDARY CRUSHERS

BELT AND BUCKET ELEVATORS

JAW CRUSHERS

SAND CLASSIFIERS

PULSATOR VIBRATING SCREENS

HEAVY DUTY FEEDERS

As an aggregate producer, you are facing the postwar prospect of rigid specifications, finer sizing requirements and far keener competition than ever before.

Is your plant and its equipment adequate to serve postwar construction market demands—at a profit?

Start your modernization plans now. Get ready for quick reconversion. Build in new plant efficiency with Telsmith Equipment.

By replacing worn out, obsolete or inadequate units with the right Telsmith machinery you can eliminate roundabout methods of handling and bottle-necks in the flow of materials. Telsmith's greater flexibility insures wider product diversification. Telsmith's speedier, smoother, trouble-free operation and greater capacity will step up your production. And Telsmith's lower power and up-keep requirements will cut down your costs.

Telsmith expert engineering help is at your disposal, whether you plan to expand, modernize or build a complete new sand and gravel or rock crushing plant. Consultation involves no obligation. Get Bulletin E-15.

TELSMITH Equipment

FOR SAND, GRAVEL, ROCK CRUSHING PLANTS

E-7

SMITH ENGINEERING WORKS, 504 EAST CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

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713 Commercial Trust Bldg. Philadelphia 2, Pa.
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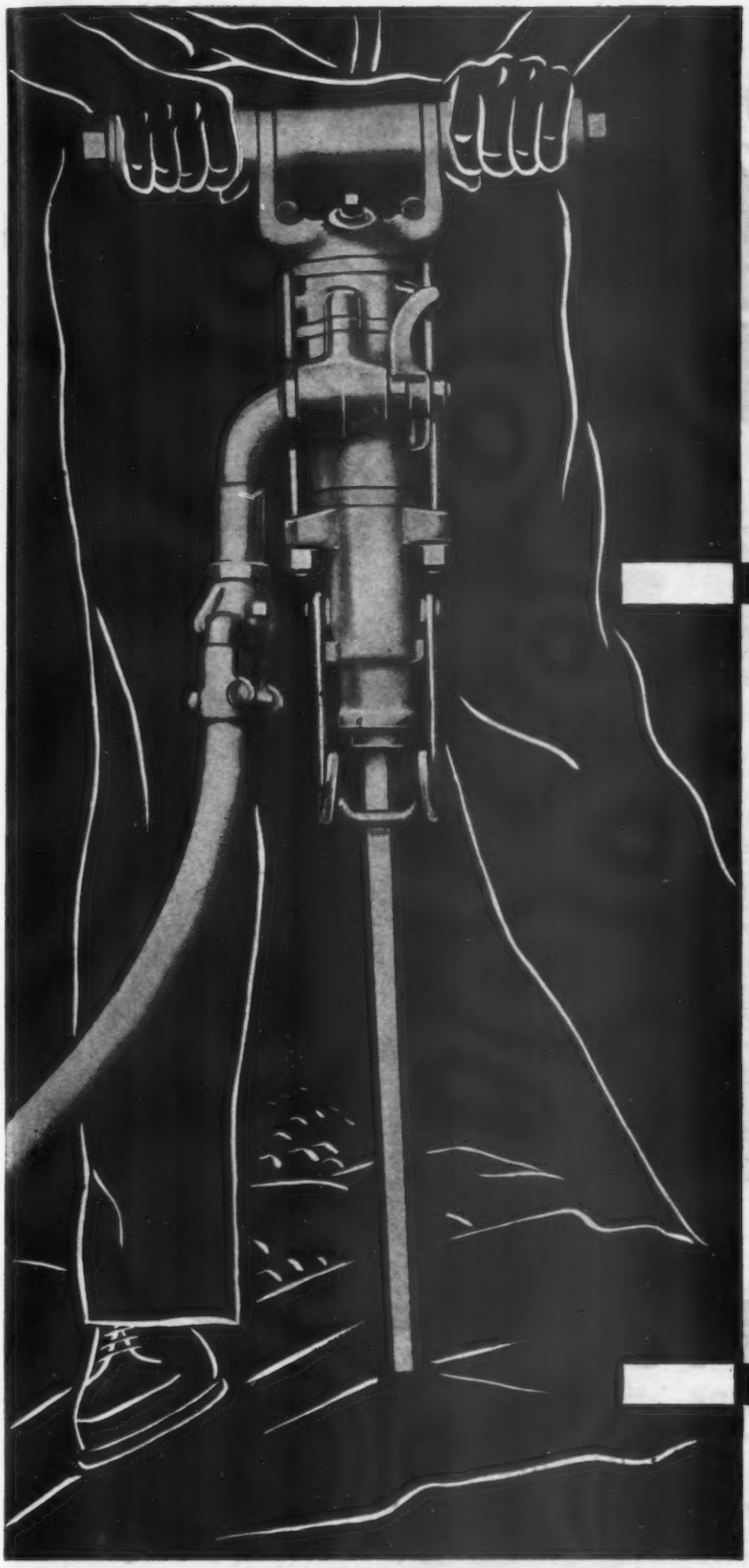
Mines Eng. & Eqpt. Co. San Francisco 4—Los Angeles 14
Brandeis M. & S. Co. Louisville 8, Ky.
Rish Equipment Co. Charleston 22, & Clarksburg, W. Va.
Rish Equipment Co. Roanoke 7, & Richmond 10, Va.
North Carolina Eqpt. Co. Raleigh and Charlotte 1, N.C.
Wilson-Weesner-Wilkinson Co. Knoxville 8, & Nashville 6, Tenn.



"Bantam Class" Sinker of Multiple Uses!

LIGHT-WEIGHT CP-22 SINKER

DESIGNED for drilling in soft-to-medium formations, the 28-pound CP-22 Sinker gives exceptional performance for its weight on many different kinds of work. Light weight and short overall length make it ideal for use in restricted quarters and flat or upward drilling in metal mines, coal mines, quarries and for general contracting use. The CP-22 Sinker Drill is known for its high drilling speed, its very efficient hole-cleaning and low air consumption. Write today for Bulletin 820

CP makes a Sinker Drill for every need from the light, 28-lb. CP-22 to the 119-lb. CP-60. Write for full information.

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PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

Light BUT tough--

For The RIGHT COMBINATION

TYPES

LS—A lighter weight bucket designed for levee and drainage work.

TS—A medium weight bucket, classified as a general purpose bucket.

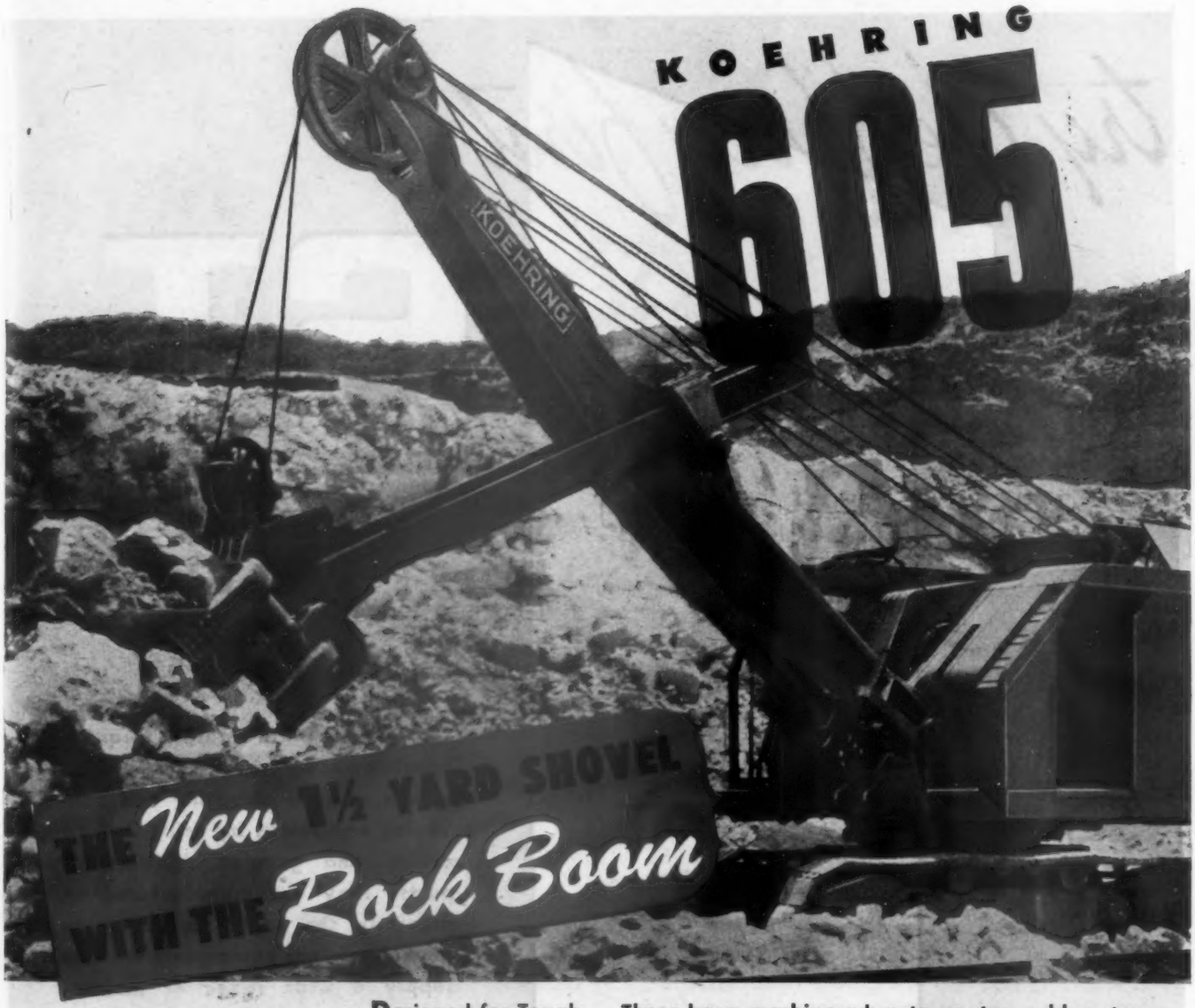
HS—A heavy duty bucket for moving shale or any hard formation.

3/8 to 30 Cubic Yards

Also available without perforations.

HENDRIX Lightweight DRAGLINE BUCKETS

DESOTO FOUNDRY, INC. · MANSFIELD, LOUISIANA



Designed for Tough Rock Digging. Heavy welded box boom. Boom-foot shock absorber takes out lateral twisting strains. Larger shipper-shaft sprocket gets more push into crowd action. Chain drive tightened by power. Three-foot boom point sheaves go easy on hoist cables. Straight, simple shipper shaft comes out easily. No boom weakness below shipper shaft because shipper shaft is set into upper edge of boom, not through center.

These base machine advantages, too, add up to better rock performance: Separate crawler frames provide the flexibility needed for tough digging. Adjustable hook rollers make possible the fine adjustment that eliminates tipping. Power clutch, set by 15-pound pull, retains "feel" of load. Straight splined shafting, not weakened by shoulders and keyways, adds digging strength.

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Insure your plant against frequent breakdowns — prevent costly shutdowns of your elevating and conveying equipment by using Jeffrey chains and genuine replacement parts. They are manufactured to precisely the same standards as govern original equipment. We can supply a wide range of maintenance items—can help you develop complete material handling systems. Investigate.

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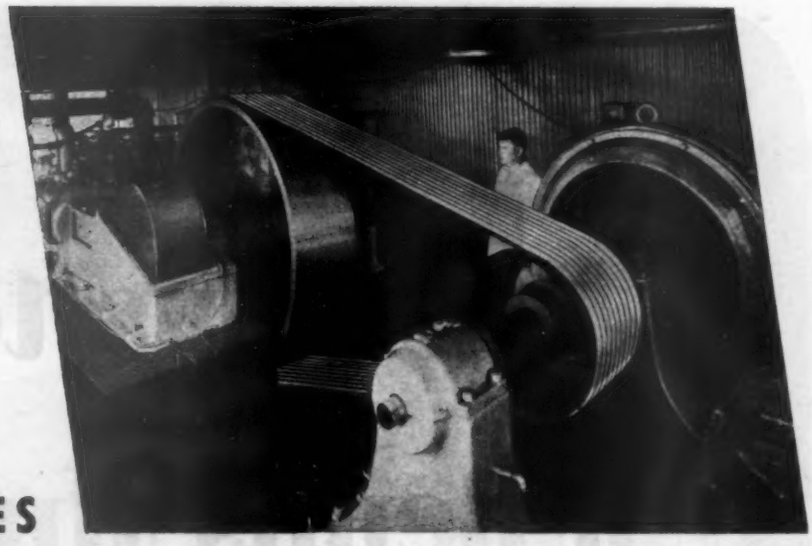
ESTABLISHED 1877

Right Now!



Your Standard
GATES VULCO ROPES

are the BEST V-BELTS Gates Ever Delivered to You!

That is a strong statement but it is simply a *fact*— and here are the reasons for it.

To meet the needs of our Army's tanks, tractors and self-propelled big guns in *combat service*, it was necessary to develop V-Belts far superior to any that had ever been built before. Gates developed and built these greatly superior V-BELTS—and here is why this fact is important to you:--

- **Every improvement developed by Gates for these Army V-BELTS has been added, day by day, to the quality of the standard Gates Vulco Ropes which have been delivered to you.**

You have not had to wait until after the war for these improvements for the simple reason that more efficient V-Belts have been an important factor in increasing essential war production. That is why your standard Gates Vulco Ropes are today the best V-Belts that have ever been delivered to you.

In addition, where V-Belts of special construction are required, your Gates Rubber Engineer is in position to supply a Gates V-Belt that is precisely engineered to meet your special needs. You need only pick up your phone book and look under the heading "Gates Rubber." The Gates Rubber Engineer will bring to you, right in your own plant, the very latest advances in V-Belt construction and in drive operation as well.

IN ADDITION--

Gates also makes these special belts to meet exceptional service needs.

- Rayon Cord V-Belts
- Static-Safety V-Belts
- *Special* Synthetic V-Belts
- Cotton Cord V-Belts
- Steel Cable V-Belts

All Gates V-Belts are Built With *The Patented* **CONCAVE SIDE**

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Engineering Offices and Jobber Stocks in All Large Industrial Centers

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GATES VULCO ROPE DRIVES

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It pays to be a Bemis Multiwall paper bag Customer

EVEN though direct government purchases have taken a considerable part of our multiwall paper bag production this year, Bemis customers have not suffered . . . they have been supplied on the basis of past purchases, even in the face of the labor shortage and no increase in facilities.

Naturally, the demand for Multiwalls has been greater than the supply. Much as we regret inability to fill all orders, we have felt a responsibility to take care of our regular customers first. Fortunately, we've been able to do that—and right on schedule. If it's humanly possible, we'll keep on maintaining this service.

War or peace, we want our customers to feel that it pays to be Bemis customers.

NORTH
WEST EAST
SOUTH

A major reason we've been able to supply our Multiwall customers is the size and flexibility of our production facilities.

Bemis Multiwall Plants at

PEORIA, ILL.
EAST PEPPERELL, MASS.
MOBILE, ALA.
SAN FRANCISCO, CALIF.
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These plants not only give us large production, but also quick accessibility to all parts of the country.

BEMIS BRO. BAG CO. Baltimore • Boston • Brooklyn Buffalo • Charlotte • Chicago
Denver • Detroit • Houston • Indianapolis • Kansas City • Los Angeles • Louisville
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SHAFER "DE" 22000 Bearings

The Self-Contained, Self-Aligning Self-Centering ROLLER BEARING with *Raceways like a Ball*

The secret of superior bearing performance is found when you combine the self-aligning, self-centering characteristics of a ball with the load carrying characteristics of a roller. The secret of superior bearing performance is *yours* when you specify Shafer ConCaVex Self-Aligning Bearings. Only Shafer *patents* make possible the exclusive advantages of the ball and roller combination in their construction. This unique principle was created by Shafer a quarter of a century ago and to date it has established bearing performance records thousands of users claim have no equal. Only bearings of the Shafer basic design are inherently immune to end and radial thrust, to misalignment and shaft deflection, to load shocks.

Ask the men who use them. SHAFER BEARING CORPORATION, 1434 West Washington Blvd., Chicago 7, Illinois.

1. SHAFER "DE" 22000 SERIES
The self-contained bearing, preadjusted, ready to install. Has one piece outer race, two rows of rollers and single inner race for compactness. Maximum capacity.

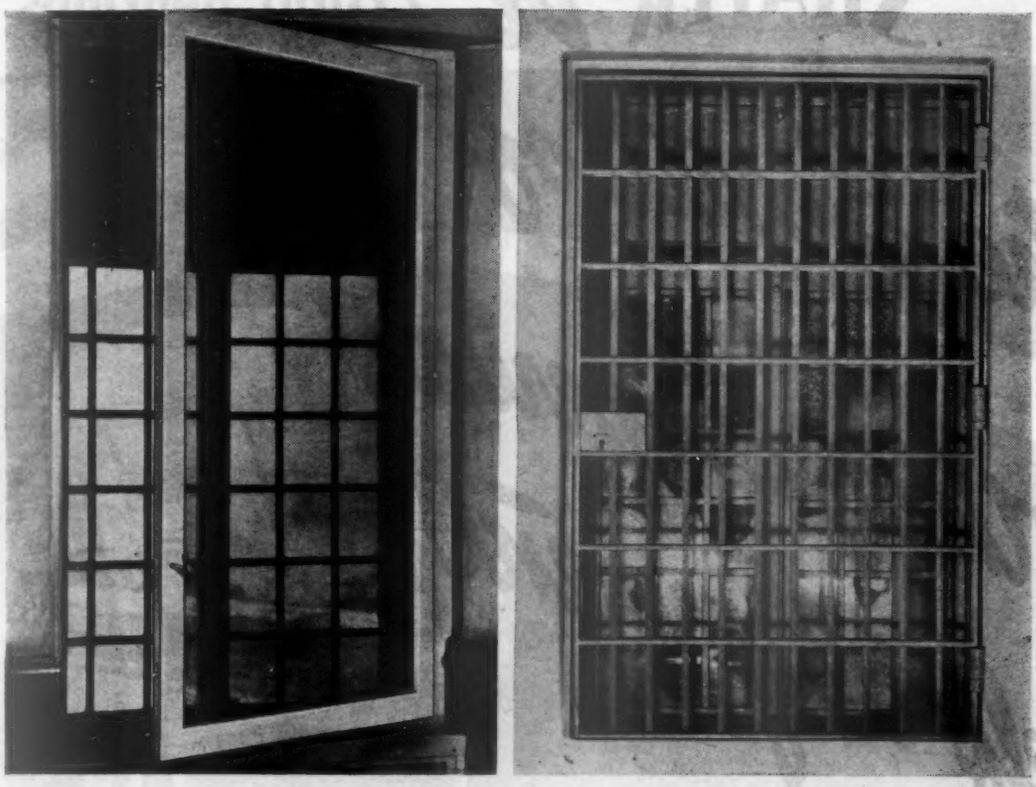
2. SHAFER DOUBLE ROW BEARING ASSEMBLY
for building into machines, power transmission equipment, etc. Two outer races, two roller assemblies. A single inner race.

3. SHAFER SINGLE ROW BEARING ASSEMBLIES
One outer race, one row of rollers, one inner race. Self-aligning with radial and thrust load capacity.

SHAFER CONCAVEX

SELF-ALIGNING ROLLER BEARINGS

Reg. U. S. Pat. Off.



Compare the probable emotional effects of these two windows, both on psychiatric patients and visitors. One window is cheerless, forbidding, prison-like. The other resembles a screened residential casement window, although equally as confining.

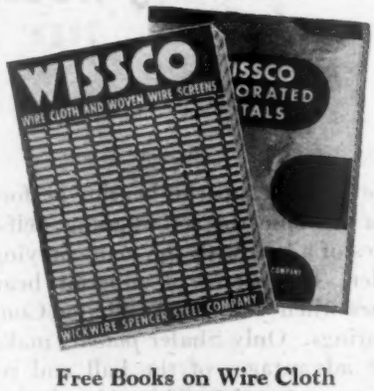
Courtesy of Chamberlin Co. of America, Detroit, Mich.

HOW WIRE CLOTH HASTENS RECOVERY OF THE MENTALLY ILL

Chamberlin Safety Detention Screens are tough, tamper-proof, and able to withstand crushing blows. Mental institutions use them instead of iron bars, for they create a pleasant, home-like atmosphere (which often hastens recovery) while providing safety for both the patient and the institution.

In making the wire cloth for Chamberlin Screens, Wickwire Spencer uses .028 stainless steel wire with a tensile of from 200,000 to 225,000 lbs. This is just one example of countless purposes for which Wickwire Spencer Wire Cloth is used. In our service to over 100 industries we make wire cloth in a dozen different types of coarse and fine weaves; in all commonly used metals; and to withstand chemical action, corrosion, abrasion, moisture or high temperature.

If you have a wire cloth need send your specifications to Mechanical Specialties Division, Wickwire Spencer Steel Company, Sterling St., Clinton, Mass.



Free Books on Wire Cloth —Perforated Metals

These profusely illustrated reference guides are filled with valuable technical information regarding proper selection and usage of wire cloth and perforated metals. For your copy of either one or both books, address Mechanical Specialties Division, Wickwire Spencer Steel Company, Sterling St., Clinton, Mass.

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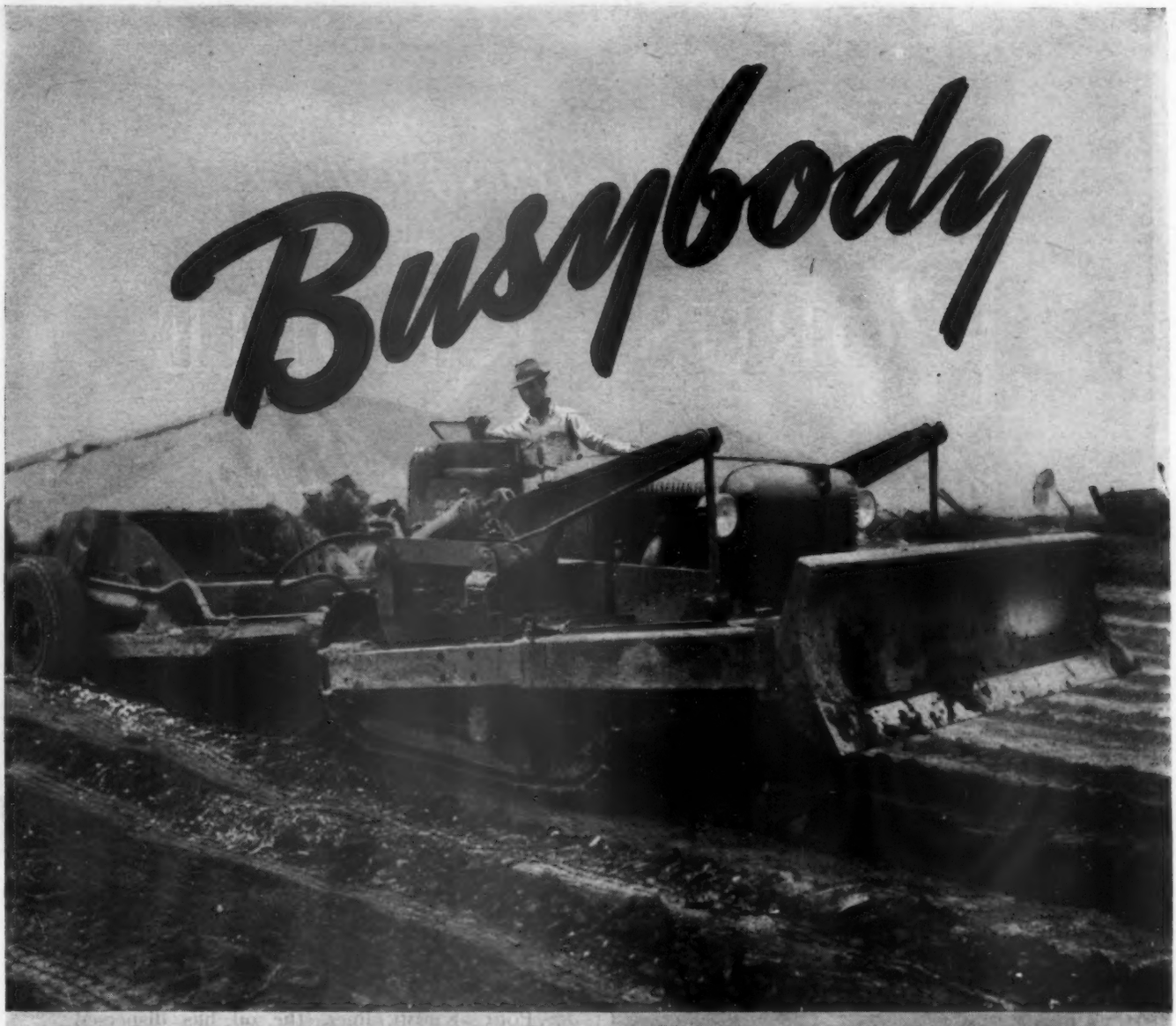


MODEL **HD-7** 2-CYCLE DIESEL. *Powerful.. Fast.. Low Cost Operation*

Never a rest for this outfit . . . keeps going from one job to another. Model HD-7 with bulldozer and 2-wheel scraper is a popular combination with aggregate producers. Strips, builds roads, clears, cleans up pits, moves machinery. On bulldozing — digs and pushes dirt, moves rock, grubs out trees and stumps. On hauling — carries material any distance, rear-dumps up or over slopes or on the level. Just the right power and speeds to handle tough jobs quickly — 60 drawbar h.p., speeds to 6.27 m.p.h. Starts and operates on low cost Diesel fuel.

A substantial number of HD-7's are available for essential users. For quick delivery, place your order with your Allis-Chalmers dealer NOW.

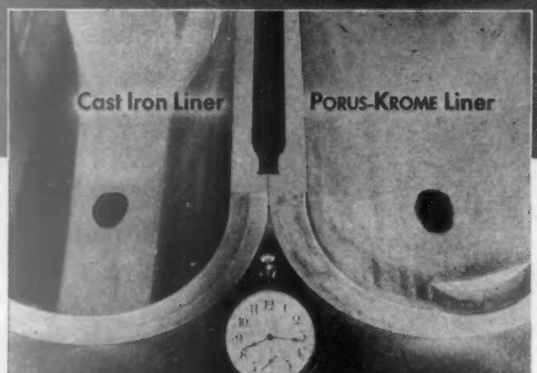
ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

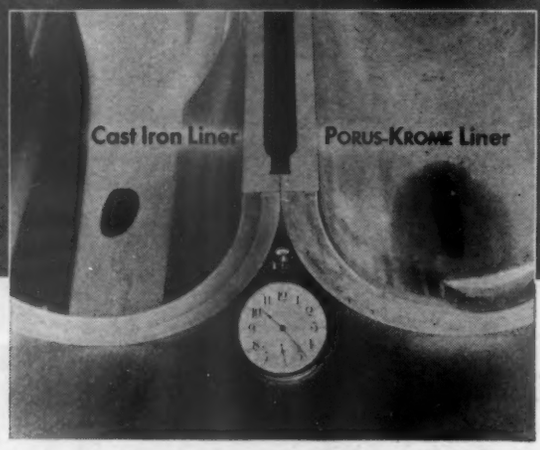
2-Cycle
THE MODERN DIESEL POWER

Here's one reason why

PORUS-KROME

multiplies cylinder life





The porosity of PORUS-KROME assures better lubrication. The tiny pores and channels in its surface serve as reservoirs for lubricating oil, feeding it back to the surface as needed. PORUS-KROME "wets" with oil many times better than cast iron does . . . and these photographs demonstrate that the rate of dispersion is a function of porosity.

Drops of oil (as shown above) are placed on a conventional cast-iron liner and on a liner which has had PORUS-KROME applied by the patented Van der Horst process. Both have been honed to the same degree of smoothness. The time is noted.

Two hours later. We see in the photograph on the right that the oil has dispersed only slightly on the cast-iron surface. On the PORUS-KROME liner, the oil has dispersed over a much larger area.

This, combined with the other characteristics of PORUS-KROME, enables it to multiply the life of cylinder liners from 4 to 20 times . . . and at the same time multiply the life of ordinary rings 3 to 5 times.

In addition to providing a "long-life" cylinder wall surface, PORUS-KROME has many diversified applications. If you have troublesome wear problems on any parts of your machines or equipment, or are seeking a way to give your customers an added value in your products, Van der Horst engineers may be able to supply the solution for you. Write today telling us just what your problems are . . . no obligation, of course. Van der Horst Corporation of America, Olean, N. Y. Plants in Olean and in Cleveland, Ohio.

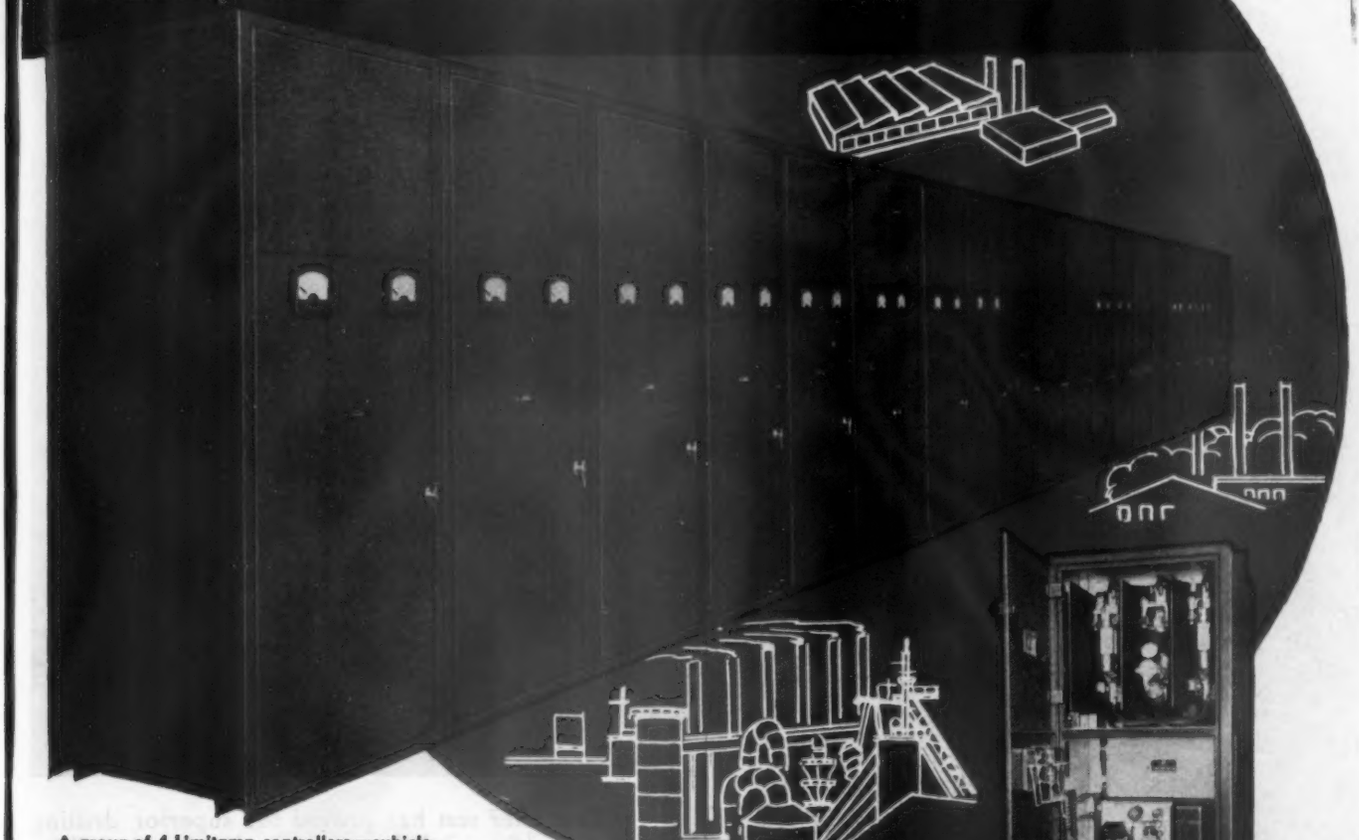
PORUS-KROME

Good for the Life of your Engines

VAN DER HORST

AN AFFILIATE OF DRESSER INDUSTRIES

2300-VOLT PACKAGED CONTROL FOR SURE, SHORT-CIRCUIT PROTECTION



A group of 4 Limitamp controllers—cubicle-type construction makes for easy installation and attractive appearance, and yet takes a small amount of floor space.

Factory-assembled Control Offers You 3 Important Savings

1. *Simplifies Purchasing and Layouts*—When you specify G-E Limitamp control, you save hours for your engineers, buyers, and draftsmen—our engineers have assumed full responsibility for selecting and assembling the correct control components for you.

2. *Saves Installation Time and Space*—Instead of many separate devices, you install only one control board. You just have to put the preassembled group control in place and connect the incoming and outgoing motor leads, and it's all set to go to work.

3. *Saves Critical Materials*—These starters help you save the vital materials that would otherwise be used for buses, conduit fittings, and wire connections.

Limitamp controllers can also be used singly.

½-cycle Operation Means Safety

Limitamp control will stop high-voltage fault currents in one-quarter cycle, and clear them in less than one-half cycle—reducing the effect of the short circuit on your motor or control.

Other Advantages, Too

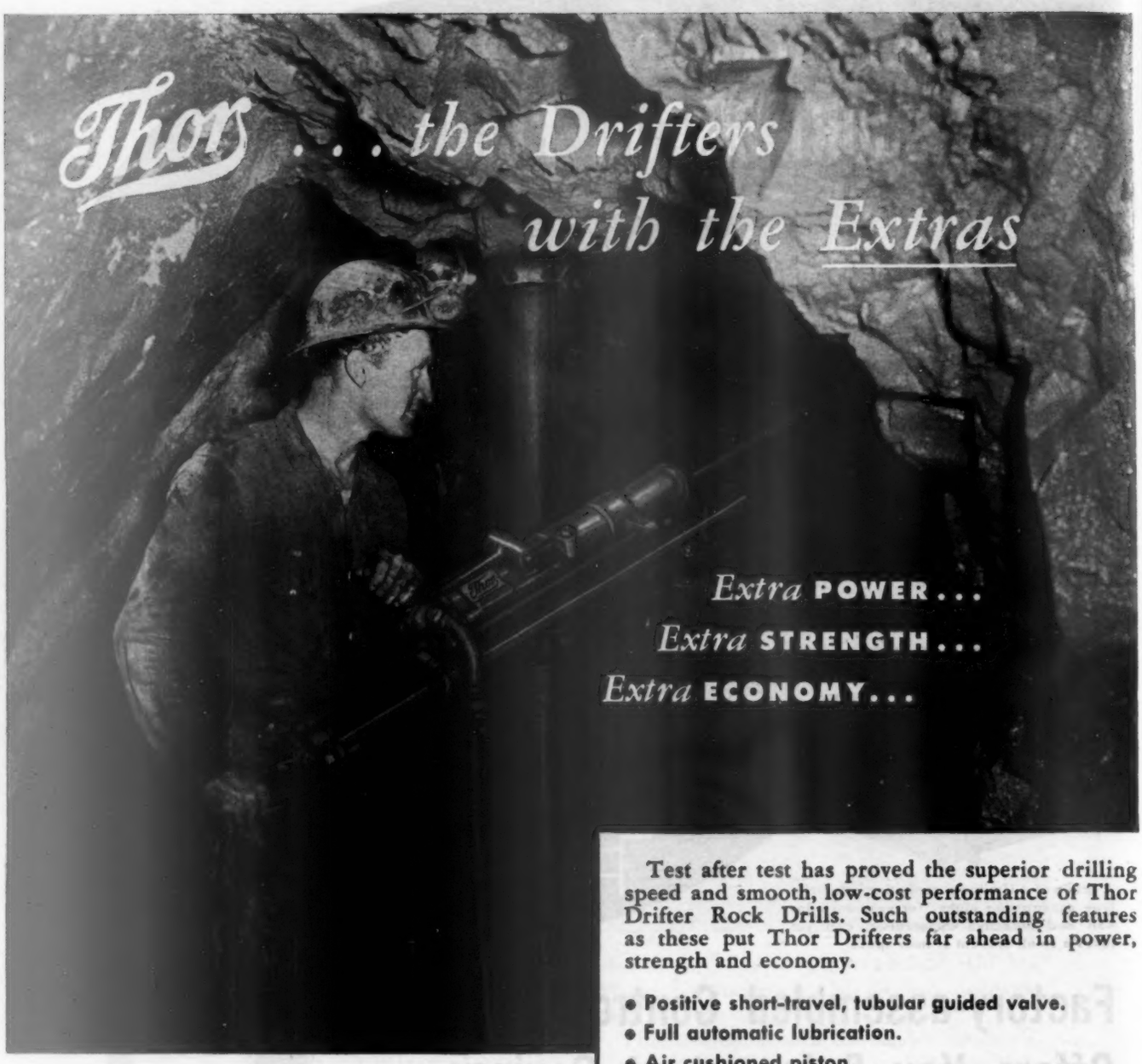
Bulletin GEA-4247 will tell you all about them—how Limitamp control affords safety for men and machines, how it can be furnished as single units, and how it comes in different enclosures for different operating conditions. For a copy, contact your local G-E office or write directly to General Electric Co., Schenectady 5, N. Y.

BUY WAR BONDS

GENERAL ELECTRIC

676-165-8900

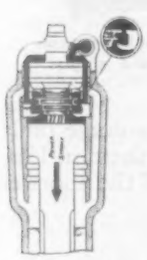
INDUSTRIAL CONTROL



Test after test has proved the superior drilling speed and smooth, low-cost performance of Thor Drifter Rock Drills. Such outstanding features as these put Thor Drifters far ahead in power, strength and economy.

- **Positive short-travel, tubular guided valve.**
- **Full automatic lubrication.**
- **Air cushioned piston.**
- **Rugged retainer.**
- **Direct-line hole blowing.**
- **Long-wear forward bearing.**
- **Extra-heavy rifle bar.**

Made in 3" and 3½" diameter cylinder bore models for light and heavy duty drilling, with hand or power feed. Thor Drifters can be furnished to take a variety of sizes and types of steels and mountings. For full specifications on these and Thor Sinker and Stoper Rock Drills, write for catalog No. 42A.



This Thor Tubular Valve with its short-travel feature (machined to a tolerance of .00025") functions *positively* to yield uniform full-power pressure for every stroke. Every blow is a hard one with power measured precisely to prevent air wastage. And, its short-travel combines with light weight to reduce wear at the sealing points.

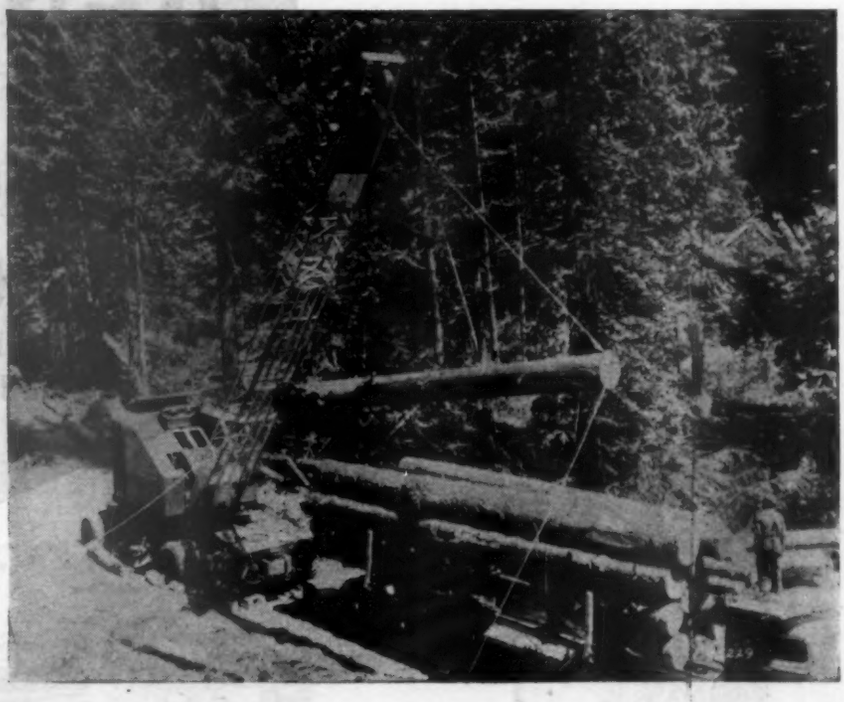
INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Blvd., Chicago 6, Illinois
New York Los Angeles

Thors **PORTABLE POWER TOOLS**

PNEUMATIC
UNIVERSAL ELECTRIC
HIGH FREQUENCY ELECTRIC

Cut Material-handling Costs
with this NEW CLUTCH

Shovels, cranes, hoists and draglines, equipped with the Fawick Airflex Clutch, are more dependable, more productive machines. They are free from the troubles of conventional clutches, with their resulting idle time and added costs.



The FAWICK Airflex Clutch

... saves TIME, space, maintenance and repairs. It has no arms, toggles or springs—needs no lubrication or adjustments—controls power and torque by air—absorbs shocks and vibration.

Proved by the Navy under battle conditions and on heavy-duty drives throughout industry.

Fawick Engineering Department will gladly give you recommendations and further details.

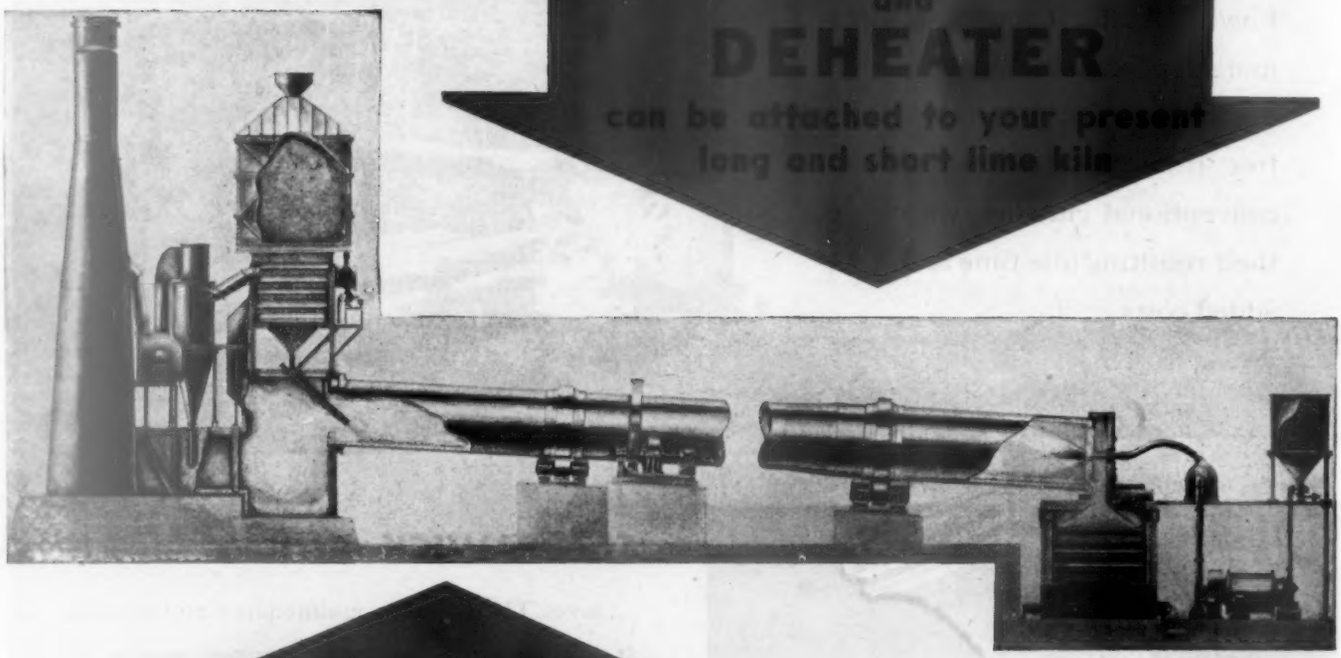
FAWICK AIRFLEX COMPANY, INC.
9919 Clinton Rd. • Cleveland 11, Ohio

In Canada, Renold-Coventry Ltd., Montreal, Toronto, Vancouver
In Britain, Crofts Engineers, Ltd., Bradford, England

FAWICK *Airflex* CLUTCH
POWER CONTROLLED BY AIR

Save your long and short kilns

KENNEDY-VAN SAUN
PREHEATER
and
DEHEATER
can be attached to your present long and short lime kiln

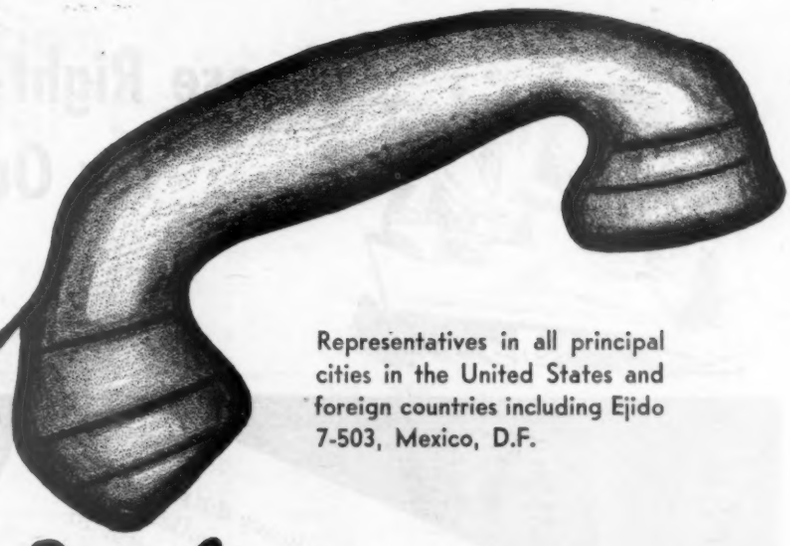


Your present LONG AND SHORT LIME KILN can be brought up to date to give you MORE LIME and BETTER LIME than a long or short Rotary Kiln of the same diameter, and you will do it with less fuel per ton of lime. We are making high grade lime in short kilns with less than 5,600,000 BTUs per ton of lime.

Call us today. Our engineers will be at your disposal without obligation to you.

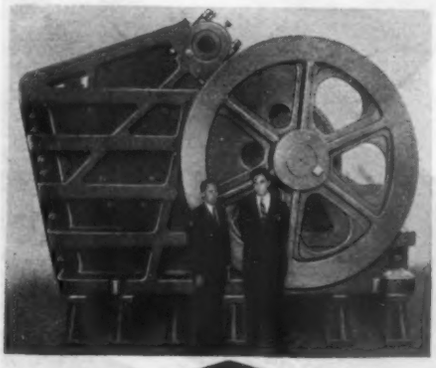
KENNEDY-VAN SAUN MFG. & ENG. CORPORATION

• • • Call KVS



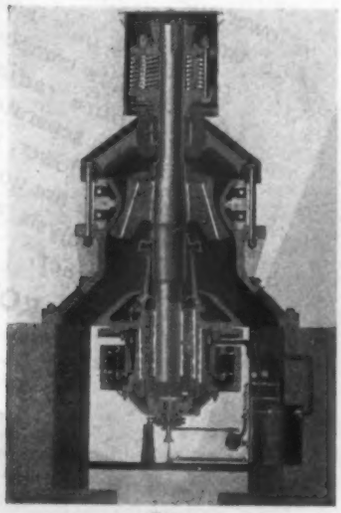
Representatives in all principal cities in the United States and foreign countries including Ejido 7-503, Mexico, D.F.

for Information on PROCESSING EQUIPMENT for Pit and Quarry Operators



KVS Swing Jaw Crusher. Extra heavy duty type. Handles large tonnages of the toughest rocks. In sizes for all needs.

KVS Gyratory Gearless Short Shaft Standard Crusher for primary reduction. A high efficiency unit.



A 24½" KENNEDY BALL BEARING GEARLESS CRUSHER with a Synchronous Motor built in its pulley. This machine shows 80% saving in cost of maintenance and a saving of 50% in power over geared crushers.

KENNEDY Products include a complete line of equipment for burning, crushing, pulverizing, sand washing, and screening.

Write for Bulletins

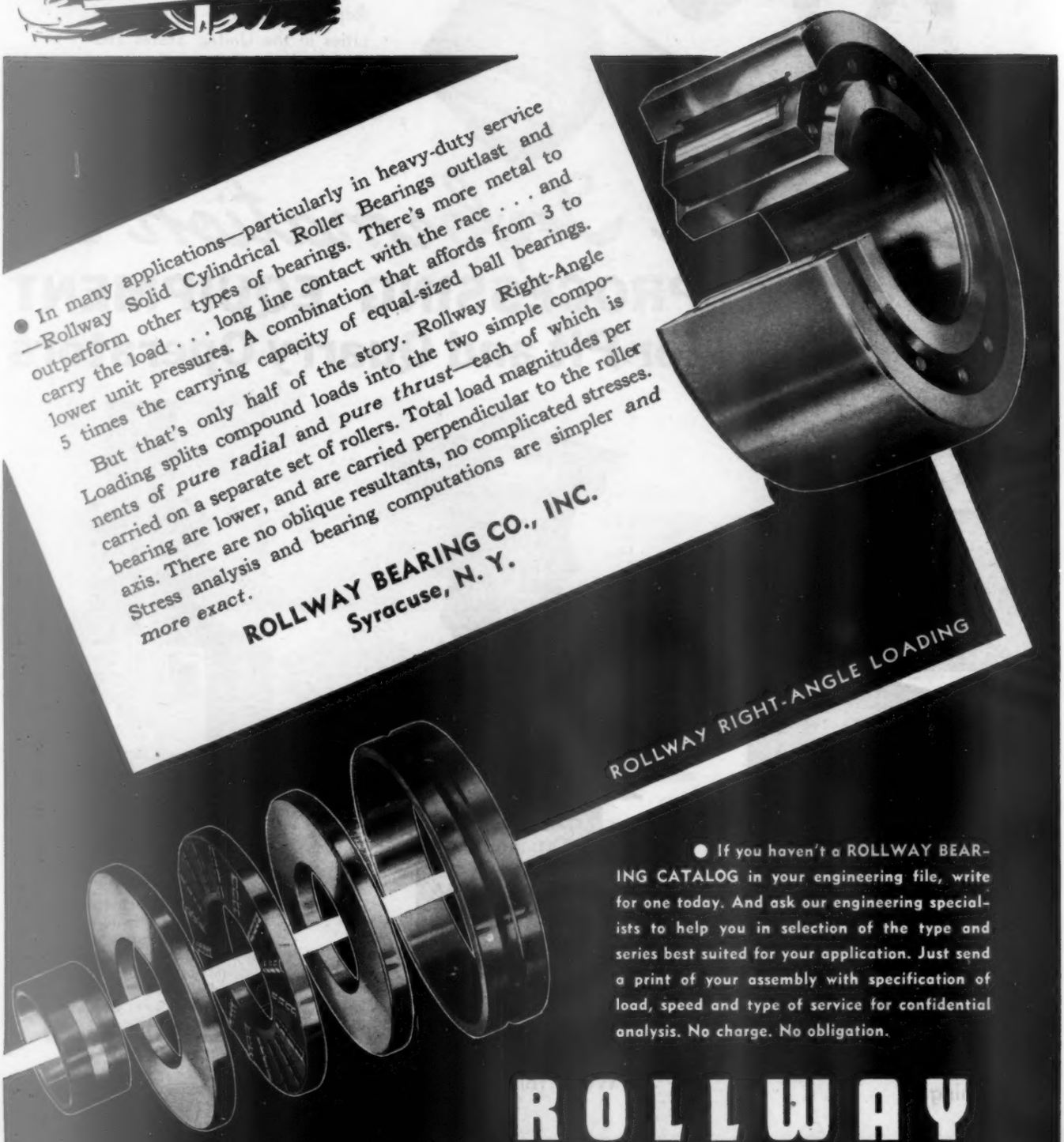
2 Park Avenue, New York 16, N.Y. Factory: Danville, Pa.

Choose Right-Angle Loading for Outstanding Performance . . .

● In many applications—particularly in heavy-duty service—Rollway Solid Cylindrical Roller Bearings outlast and outperform other types of bearings. There's more metal to carry the load . . . long line contact with the race . . . and lower unit pressures. A combination that affords from 3 to 5 times the carrying capacity of equal-sized ball bearings.

But that's only half of the story. Rollway Right-Angle Loading splits compound loads into the two simple components of *pure radial* and *pure thrust*—each of which is carried on a separate set of rollers. Total load magnitudes per bearing are lower, and are carried perpendicular to the roller axis. There are no oblique resultants, no complicated stresses. Stress analysis and bearing computations are simpler *and more exact.*

ROLLWAY BEARING CO., INC.
Syracuse, N. Y.

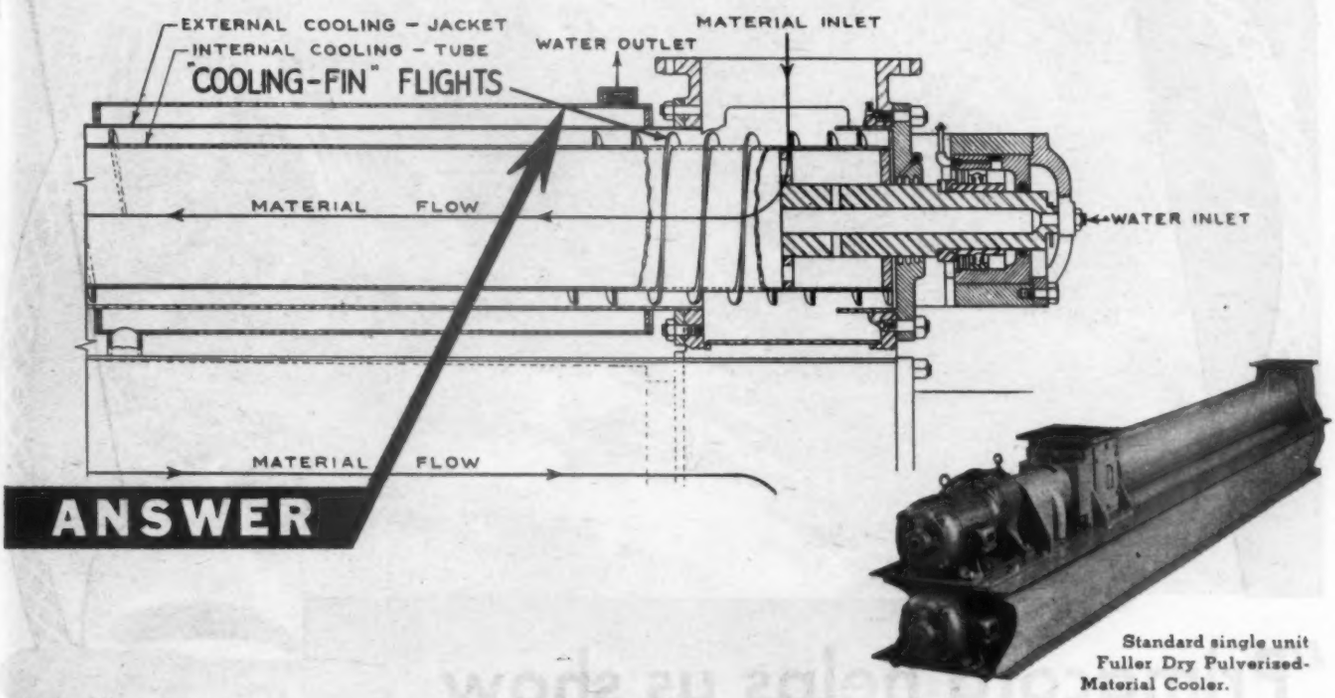


● If you haven't a ROLLWAY BEARING CATALOG in your engineering file, write for one today. And ask our engineering specialists to help you in selection of the type and series best suited for your application. Just send a print of your assembly with specification of load, speed and type of service for confidential analysis. No charge. No obligation.

ROLLWAY
CYLINDRICAL ROLLER BEARINGS

SALES OFFICES: Philadelphia • Boston • Pittsburgh • Youngstown • Cleveland • Detroit • Chicago • St. Paul • Houston • Tulsa • Los Angeles

The $64.00 Question . . .
Why Do Fuller Coolers Really Cool?



Standard single unit Fuller Dry Pulverized-Material Cooler.

The water-cooled screw which carries the material, the flights of which are specially welded to a hollow shaft, is designed on the same principle as the so-called "fin-tube", so successfully used by the refrigeration industry for efficient and rapid transfer of heat.

With this design and construction approximately 75 per cent of the heat extracted is carried off by the water circulated through the relatively large hollow screw shaft. The outer water jacket provides the remaining heat extraction.

These units are totally enclosed and dustless. The compact and rugged design makes for easy installation with minimum head room and support requirements.

Write for Bulletin PMC-1

FULLER COMPANY

CATASAUQUA, PENNSYLVANIA

Chicago 3 - 1144 Marquette Bldg.
San Francisco 4 – 421 Chancery Bldg.
Washington 5, D. C - 618 Colorado Bldg.

FULLER COMPANY

FULLER-KINYON, FULLER-FLUXO AND THE AIRVEYOR CONVEYING SYSTEMS . . . ROTARY FEEDERS AND DISCHARGE GATES . . . ROTARY AIR COMPRESSORS AND VACUUM PUMPS . . . AIR-QUENCHING INCLINED-GRATE COOLERS . . . DRY PULVERIZED-MATERIAL COOLER . . . AERATION UNITS . . . MATERIAL-LEVEL INDICATORS . . . MOTION SAFETY SWITCH . . . SLURRY VALVES . . . SAMPLERS

PMC-11

"Primacord helps us show a better profit"

Every pit and quarry man is interested in more profitable operation. Rising production costs are not always compensated for by permissible price increases in the finished product. Even the smallest waste of explosives or time may mean red ink on the ledger.

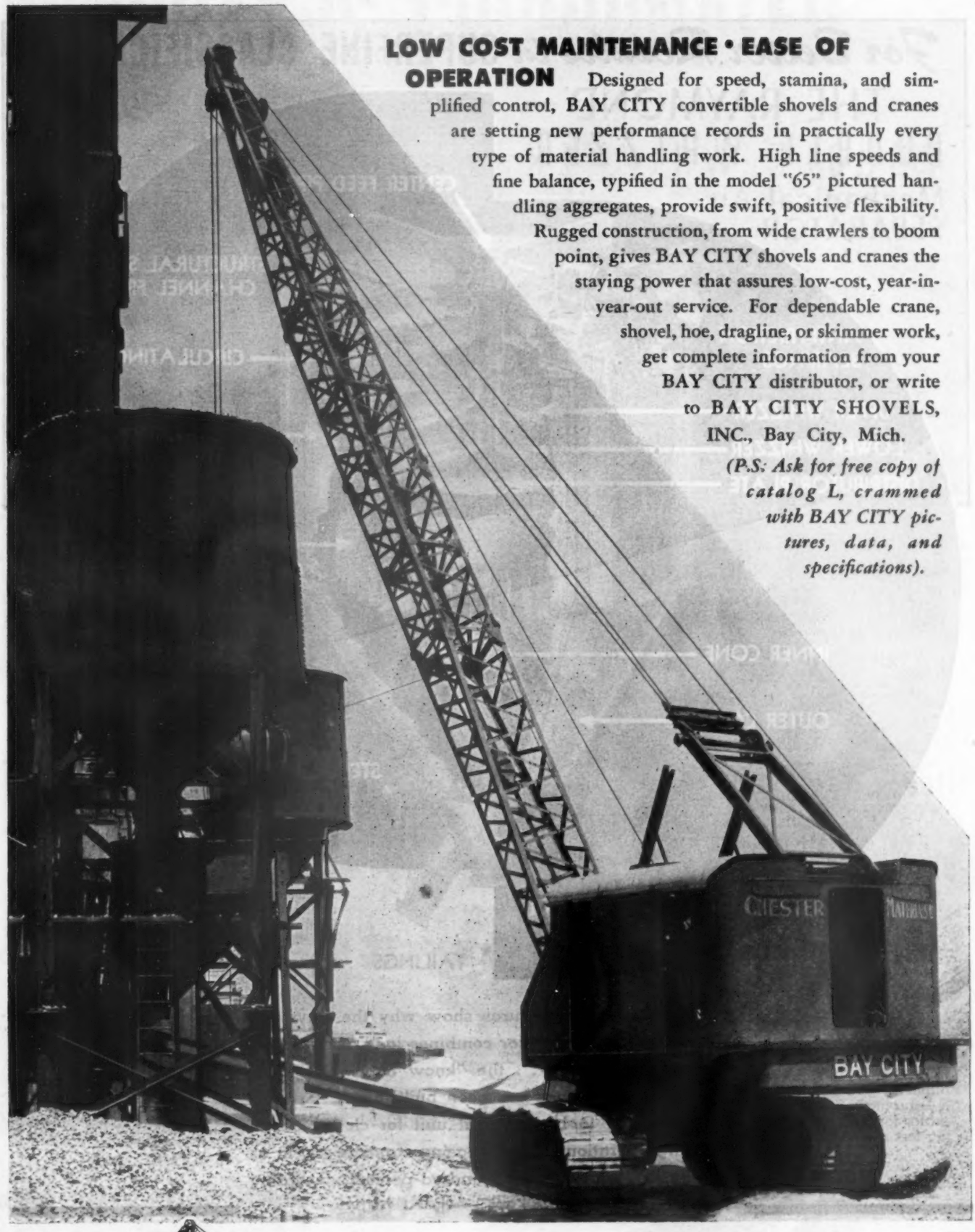
Primacord gets the most out of explosives. It detonates with full power every cartridge in the hole, in decks or solid loads, and every hole in the row. Its action is virtually instantaneous, yet rows follow a sequence to relieve burdens efficiently.

Primacord gets the most out of careful planning, for loads can be varied to meet conditions and an unlimited number of holes can be shot at one time.

Primacord gets the most out of man hours. It handles easily and with great safety for it must be detonated. Sparks, friction, static and ordinary shock do not affect it. It makes up quickly with square knots and half hitches. It requires a minimum of time and effort to load and check. P-8

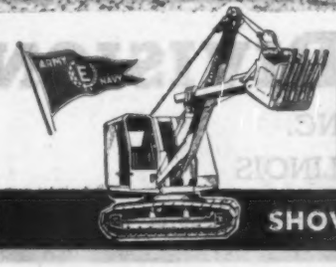
THE ENSIGN-BICKFORD COMPANY • Simsbury, Connecticut

PRIMACORD-BICKFORD Detonating • Fuse •



LOW COST MAINTENANCE • EASE OF OPERATION Designed for speed, stamina, and simplified control, BAY CITY convertible shovels and cranes are setting new performance records in practically every type of material handling work. High line speeds and fine balance, typified in the model "65" pictured handling aggregates, provide swift, positive flexibility. Rugged construction, from wide crawlers to boom point, gives BAY CITY shovels and cranes the staying power that assures low-cost, year-in-year-out service. For dependable crane, shovel, hoe, dragline, or skimmer work, get complete information from your BAY CITY distributor, or write to BAY CITY SHOVELS, INC., Bay City, Mich.

(P.S. Ask for free copy of catalog L, crammed with BAY CITY pictures, data, and specifications).

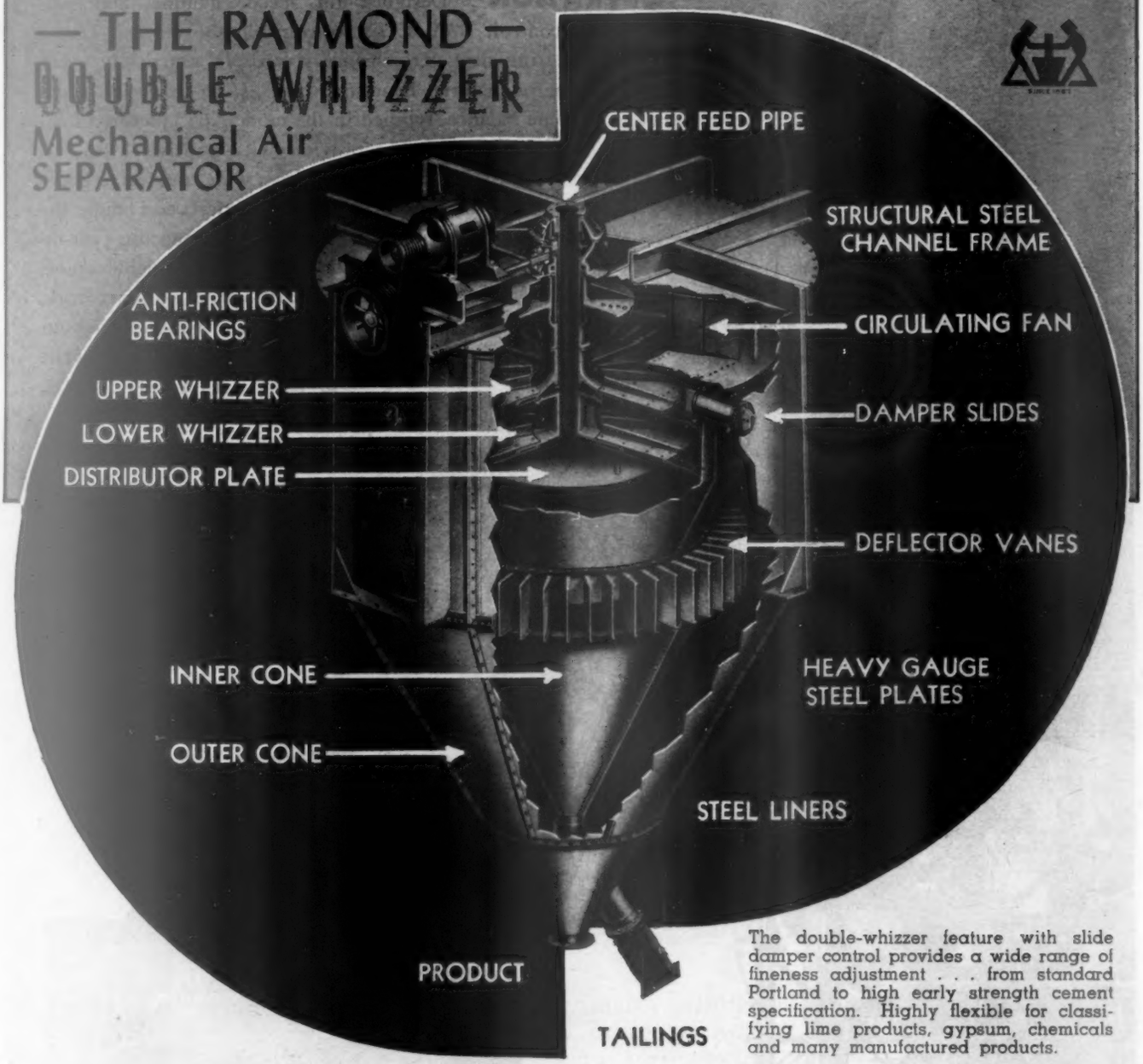


BAY CITY

SHOVELS · CRANES · DRAGLINES · TRENCH HOES

For Better Results in SUPERFINE CLASSIFICATION

— THE RAYMOND — DOUBLE WHIZZER Mechanical Air SEPARATOR



The double-whizzer feature with slide damper control provides a wide range of fineness adjustment . . . from standard Portland to high early strength cement specification. Highly flexible for classifying lime products, gypsum, chemicals and many manufactured products.

Built in nine sizes from 2'6" to 18'0" diameter . . . also a Laboratory Separator for classifying test samples.

These construction features show why the Raymond Mechanical Air Separator combines long service with low-cost operation . . . the "know how" of a half-century of experience has been built into it.
It has proved to be an ideal unit for closed circuit grinding operations . . . increasing capacities from as low as 25% up to several hundred percent, according to the material handled.

Write for Separator Bulletin No. 56.

RAYMOND PULVERIZER DIVISION

COMBUSTION ENGINEERING COMPANY, INC.
1321 NORTH BRANCH STREET, CHICAGO 22, ILLINOIS

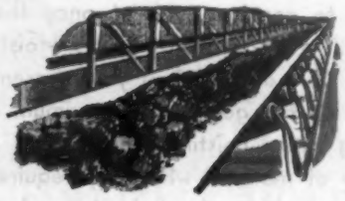
Sales Offices in Principal Cities — Canada: Combustion Engineering Corp., Ltd., Montreal

WHAT IS COORDINATED CONVEYOR ENGINEERING?

Simply this: three separate engineering staffs working as a team to provide a system of low cost haulage of coal, ore, sand, gravel and other bulk materials. These three are engineers representing: mine or plant operators, conveyor equipment manufacturers and United States Rubber Company.

Such three-way teamwork results in a belt conveyor which carries materials efficiently, handles

output at minimum cost. Thousands of U. S. Rubber Conveyor Belts, designed and installed through coordinated engineering, are contributing to low cost conveying.



SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

1230 SIXTH AVENUE · ROCKEFELLER CENTER · NEW YORK 20, N. Y.

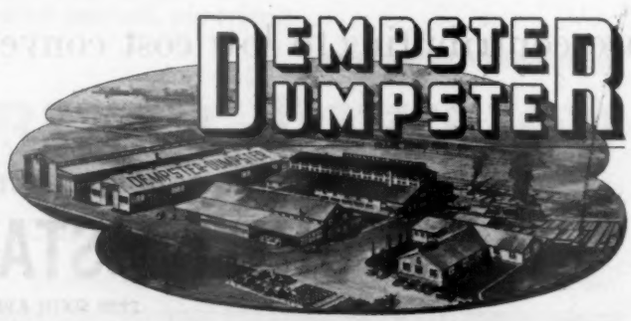
IT'S THE SURE WAY TO CUT COSTS OF PRODUCTION IN YOUR QUARRY!

★ The Dempster-Dumpster system of materials handling has been a "life-saver," so to speak, for many quarry, cement, sand, gravel and other industrial plants during recent years. This is easily understood, once you realize the big job the Dempster-Dumpster is capable of.

To see it in operation, no stretch of the imagination is necessary to convince you at once that one truck, equipped with a Dempster-Dumpster Hoisting Unit, will do the same work of 3 to 5 of your present trucks. This one truck is on the go—giving maximum service—in a never ending cycle, hoisting, hauling and dumping one loaded body of material while any required number of other bodies are being loaded. A synchronized system of haulage that saves trucks, tires, gas, time, manpower and money.

The above illustrations show clearly how the Dempster-Dumpster system works at the loading point. No tracks to lay and move around. Empty bodies are placed exactly where they will be most conveniently loaded. No time is wasted by men or equipment.

Let our engineers assist you in simplifying haulage of material in your operation. Write for completely illustrated catalog NOW. Dempster-Brothers, Knoxville 17, Tennessee.

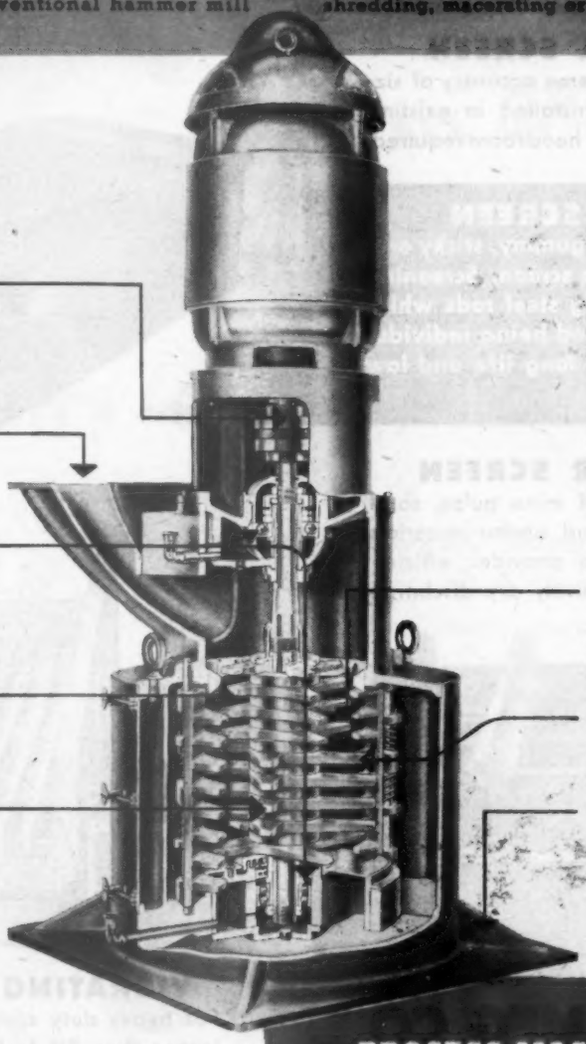


FOR GRINDING...SHREDDING...PULPING...PUREEING...

No other mill gives you *ALL* the outstanding advantages of the new

ENTERPRISE Vertical Mill

Naturally, you can do more effective work in a *vertical* position than you can in a horizontal position and so can a grinding mill. The New Enterprise Vertical Mill is essentially the conventional hammer mill stood on end...a design offering you many benefits obtainable in no other way. There is an Enterprise Vertical Mill to meet your specific needs of grinding, shredding, macerating or pulping.



Less power loss...less operating noise because motor is direct-connected without gears or belts. *Belts and gears in horizontal mills usually are noisy, result in lost power.*

Less labor because vertical construction permits down feed and down discharge. *Horizontal mills require excessive handling of materials.*

Longer operating life because fully lubricated bearings are in moisture and dust-proof housings.

Uniform quality of grind assured by even distribution of material around rotor. *In horizontal mills, smaller discharge area usually results in material "bunching."*

Faster maintenance because hammers are changed in minutes... *not hours!*

More effective work, free from vibration, because the mill grinds for full revolution of rotor. *In horizontal mills, only one-half of each revolution works. Result: Vibration, less work.*

Longer hammer life because even wear on rotors maintains perfect balance. *In horizontal mills, uneven wear on rotors results in unbalanced operation, shortened hammer life.*

Quick change of grind fineness because inexpensive screens are easily changed. *Horizontal mills usually require extensive alteration to produce different finenesses of grind.*

Fast complete grinding at slower speeds because full revolution of rotor is utilized. *Ordinary mills, running at the same speed, work only half as fast.*

Less floor space needed because of vertical design. *Horizontal mill requires large floor area in plant.*

WRITE FOR THE NAME OF YOUR NEAREST DEALER

for complete information on the many types of rotors and accessory equipment available.

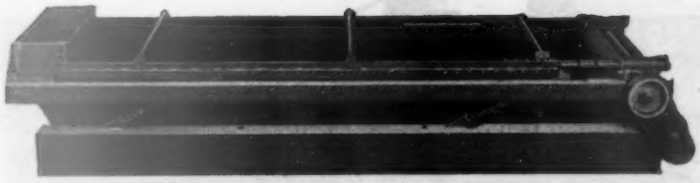
PROCESS MACHINERY DIVISION
OF
ENTERPRISE ENGINE & FOUNDRY CO.

18th & Florida Streets — San Francisco, California

Enterprise Process Machinery

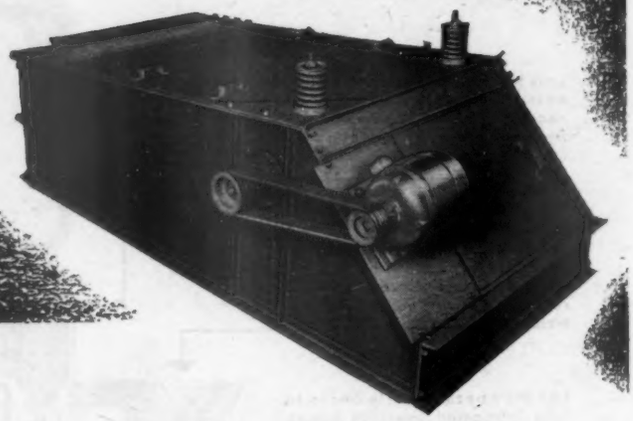
Wherever Screening is Done

One of these four types of Symons Screens will meet your requirements for screening of ores, coal, aggregates, minerals, chemicals, etc. *Write for descriptive bulletins . . . . .*



HORIZONTAL SCREEN

Recommended where extreme accuracy of sizing is essential. Easily installed in existing plants because of minimum headroom required

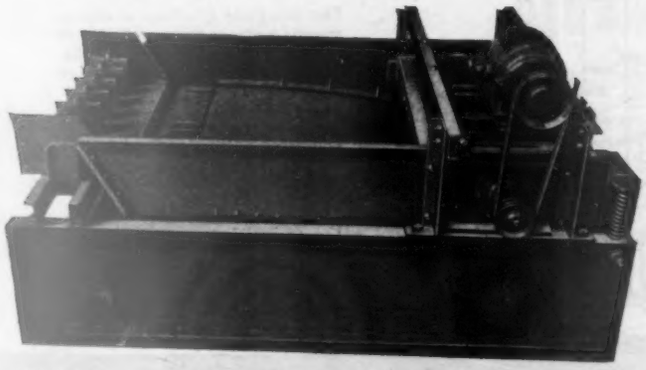


ROD DECK SCREEN

Applicable for handling gummy, sticky ores and materials difficult to screen. Screening surface consists of spring steel rods which permit of big capacity and being individually replaceable assures long life and low maintenance cost.

HYDRO-SIZER SCREEN

For fine wet screening of mine pulps, sand, chemicals, oil well mud and similar materials. Unusual screening action provides efficient separation with comparatively dry discharge.



VIBRATING BAR GRIZZLY

For heavy duty scalping service for openings larger than 2½ inches. The intensive vibrating action is particularly effective on feeds that are sticky and gummy.

NORDBERG MFG. CO.
MILWAUKEE 7, WISCONSIN
NEW YORK · LOS ANGELES · LONDON · TORONTO

SYMONS SCREENS

IT'S ALL *GREEN* NOW

IT'S BETTER THAN EVER

IT'S *LAY·SET* PREFORMED I.P.S.*

LAY·SET Preformed Improved Plow Steel* has always been Hazard's highest quality rope. Now it is better than ever, because every strand is literally packed with GREEN-LUBE—a superior, more adherent lubricant. This All-Green **LAY·SET** Preformed will last longer, give better service. GREEN-LUBE is a more costly lubricant—but not to you. It is Hazard's assurance that when you specify **LAY·SET** Preformed Improved Plow Steel you ask for the best there is in wire rope.

ACCO

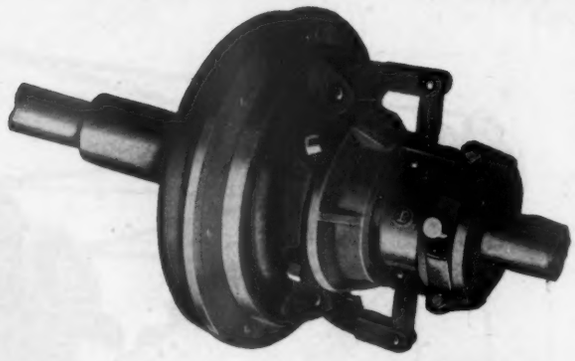
Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Bridgeport, Conn.

HAZARD WIRE ROPE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

JONES-LEMLEY FRICTION CLUTCHES



JONES-LEMLEY friction clutches are built for a broad range of shaft sizes and ratings in both enclosed and open types for sleeve and coupling work. In addition they are available in a line of Jones-Lemley friction clutch pulleys. This clutch modification is also used for gears, V-belt sheaves, sprocket wheels, etc. Sizes, ratings, dimensions, prices and other data are contained in Bulletin No. 60. Your request will bring a copy.

W. A. JONES FOUNDRY & MACHINE CO., 4441 Roosevelt Rd., Chicago, Illinois

Jones

HERRINGBONE — WORM — SPUR — GEAR SPEED REDUCERS • PULLEYS
CUT AND MOLDED TOOTH GEARS • V-BELT SHEAVES • ANTI-FRICTION
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In addition, Multiwall Paper Bags are easy to handle . . . save manpower and valuable loading and unloading time.

Faster packaging, too – Specially designed St. Regis bag-filling machines bring high speed and a saving of labor and equipment to the users of Multiwall Bags.

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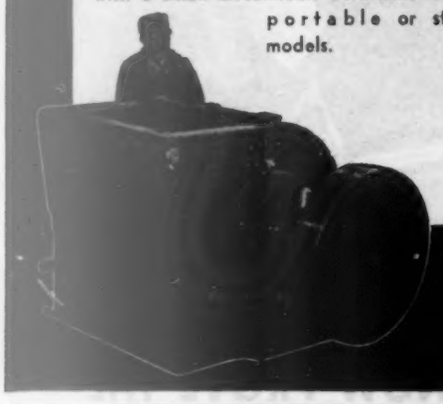

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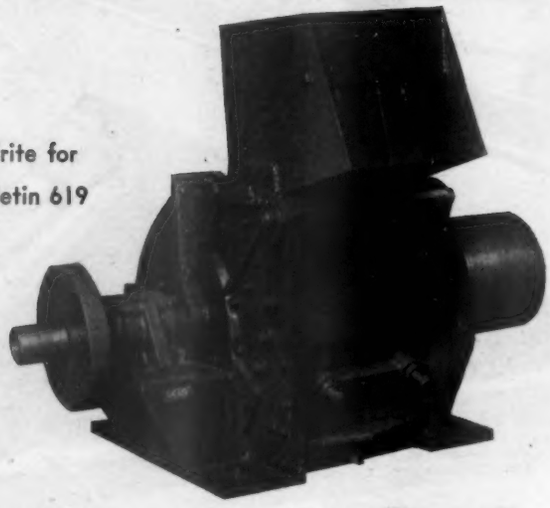

The Williams Patent Crusher and Pulverizer Co.
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OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
PATENT CRUSHERS GRINDERS SHREDDERS

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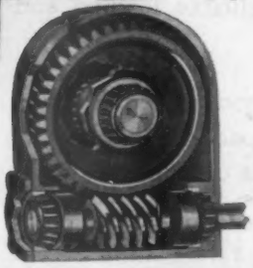

BAUGHMAN ALWAYS SETS THE PACE!

Here is the all-around machine you have been waiting for — put it on your truck and use it the "whole year 'round." Spreading lime is only one of the many jobs this model will do!

MODEL K Wide Throat Drag Chain Type

Steel Body and Undercarriage. Capacities, 5 to 15 tons. Made in 9, 11, 13, 15 and 17 lengths — and 19, 21, 23 and 25 foot lengths with sideboards.

Handles wet or dry lime. Timken straddle mounted bearings, ball and roller bearings throughout. Only two oil-sealed cases and 1 short roller chain drive. Automatic chain feed regulator. Automatic endgates — large endgate for fast dumping. New style automatic drag chain tightener with anti-wrap chain stop. Only 1 patented distributor used. Spreads from 35 to 45 feet depending upon truck speed.

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• Cut down their idle time. Keep trucks moving in rapid rotation with a fast feeding Barber-Greene Bucket Loader.

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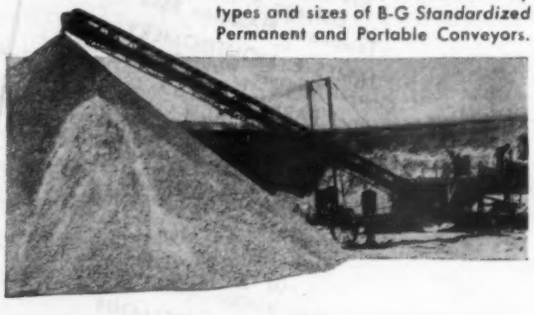

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Barber-Greene B G *Constant Flow Equipment*

PIT AND QUARRY

AUGUST, 1945

Vol. 38 No. 2

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PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

ROCK drills and other air-driven construction machinery can operate dependably only when air supply from the compressor is full and continuous. This necessitates keeping air lines clear and compressors operating at maximum efficiency.

To assure the effective compressor lubrication essential to trouble-free performance, *Texaco Alcaid, Algol or Ursa Oils* are used by contractors all over the world.

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FOR ALL AIR COMPRESSORS AND TOOLS

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT—CBS

EDITORIAL

Post-War Labor Relations

THE recent signing of a management-labor charter, by Eric Johnston of the Chamber of Commerce of the United States as the representative of a rather large number of organized employers and by William Green of the American Federation of Labor and Phil Murray of the Congress of Industrial Organizations representing large groups of organized workers, was widely applauded at the time as the beginning of the end of labor strife in this country. There was little reason to doubt the earnestness of those who had drafted it or the sincerity of their desire to narrow the gulf and soften the differences between employers and workers, although they, being practical men, may have been skeptical of the extent to which it might be effective in allaying growing mistrust on the part of both groups. Even white-collar workers and others not affiliated even in their sympathies with either group felt that this event inaugurated a new era in employer-employee relations, that here was a fresh start toward an intelligent understanding of the common problems and aspirations of employers and workers, and that out of it might come benefits to other sections of the population also. Unfortunately, serious labor struggles that have been started since then, have shaken the faith and chilled the hopes of some members of all these groups to such an extent that a spirit of defeatism has supplanted their confidence and they face the future with increased misgiving.

The simplicity of the provisions of this charter made it impossible for people deeply interested in improving labor relations to look upon it as anything more than a first step. It stated principles that are generally accepted, management guaranteeing that it will continue the practice of collective bargaining, and labor guaranteeing that it will let management manage—all within the framework of private enterprise. In a statement so general, there could hardly have been included definite provisions covering the many difficulties that have arisen and will continue to arise between employers and workers, so that it is not to be wondered at that the initial enthusiasm aroused by its announcement should have waned under the influence of further and calmer consideration. Nevertheless, we believe that the management-labor charter is of value because both employers and employees, through their chosen organization spokesmen, have committed themselves to the acceptance of principles which, while not new, remain in the minds of many persons as problems that still must be fought out, using all the implements and tactics that have made labor strife an ugly element in our civilization. We hope that it will be followed soon by other declarations of principles, which will reduce still further the area within which either employers or employees can feel justified in making their differences the causes for bitter and prolonged struggles.

Viewing labor relations realistically, we do not believe that thoughtful students of the problem can reasonably expect that any single document or piece of labor legislation will eliminate disputes in that field. Nothing short of complete domination by the state—a condition we have come to identify as Fascism among our enemies—can eradicate labor strife; and that, as industrialists and workers in Fascist countries know from painful experience, is a form of tyranny that lies as heavily on employers as on employees because it enslaves and impoverishes both.

Good will and relative peace in the field of labor relations are attainable under democratic government as long as there is on both sides a willingness to discuss grievances frankly, to recognize and give consideration to the rights of employers and employees and the supposedly unaffected "general public," and to submit seemingly irreconcilable differences to conciliation and arbitration. When the right to discuss problems of common interest is denied by the oppressive acts of government, employers' association or workers' organizations, there can be no peaceful settlement of labor disputes, nor can there be much likelihood of attaining "labor peace."

THE number of controversies between employers and workers can be greatly reduced by removing the causes from which they spring. Continuous unemployment or irregular employment (neither relieved by adequate unemployment compensation), substandard wages, unsafe and unhealthful working conditions, the absence of fair means for the adjustment of grievances, and hiring and firing practices involving discrimination based on criteria other than competence and related measures of fitness are some of the seeds of discontent from which grow militant rank-and-file unionism, dishonest labor representatives, violent strikes, and interruptions of essential public services. Labor strife will be a constant threat to peaceful and dignified living as long as its causes are allowed to exist.

There are a few employers and a few labor-organization representatives who eagerly await the end of the war, so that they can resume the struggle to decide who shall be on top, business or labor. Employers who want to "smash the unions" and labor men who threaten to "take over the functions of management" are the extremists in their respective groups, and it would be a sad day for the cause of industrial peace if either group should attain its expressed objectives. If their views should prevail and the struggle develop, government intervention on a scale heretofore unknown in this country would be inescapable and the liberty both groups now enjoy would certainly be put in jeopardy and might even be destroyed.

SCHRAMM

CLOSED DOOR AIR COMPRESSOR

PROTECTED Hitting POWER

...like a TANK!

SCHRAMM No. 315 diesel engine driven Compressor, operating three heavy-duty jack hammer type drills.

"PUNCH" *alone* is not enough—for either tanks or air compressors. Both require defensive features, in addition to long-range hitting power.

SCHRAMM machines top 'em all in driving drills from a protective housing. The compressor doors can always be kept in place—a condition made possible by SCHRAMM uniform water cooling.

This SCHRAMM feature provides safety against dust, grit, and pilfering of parts, and insures continuous performance under all working conditions.

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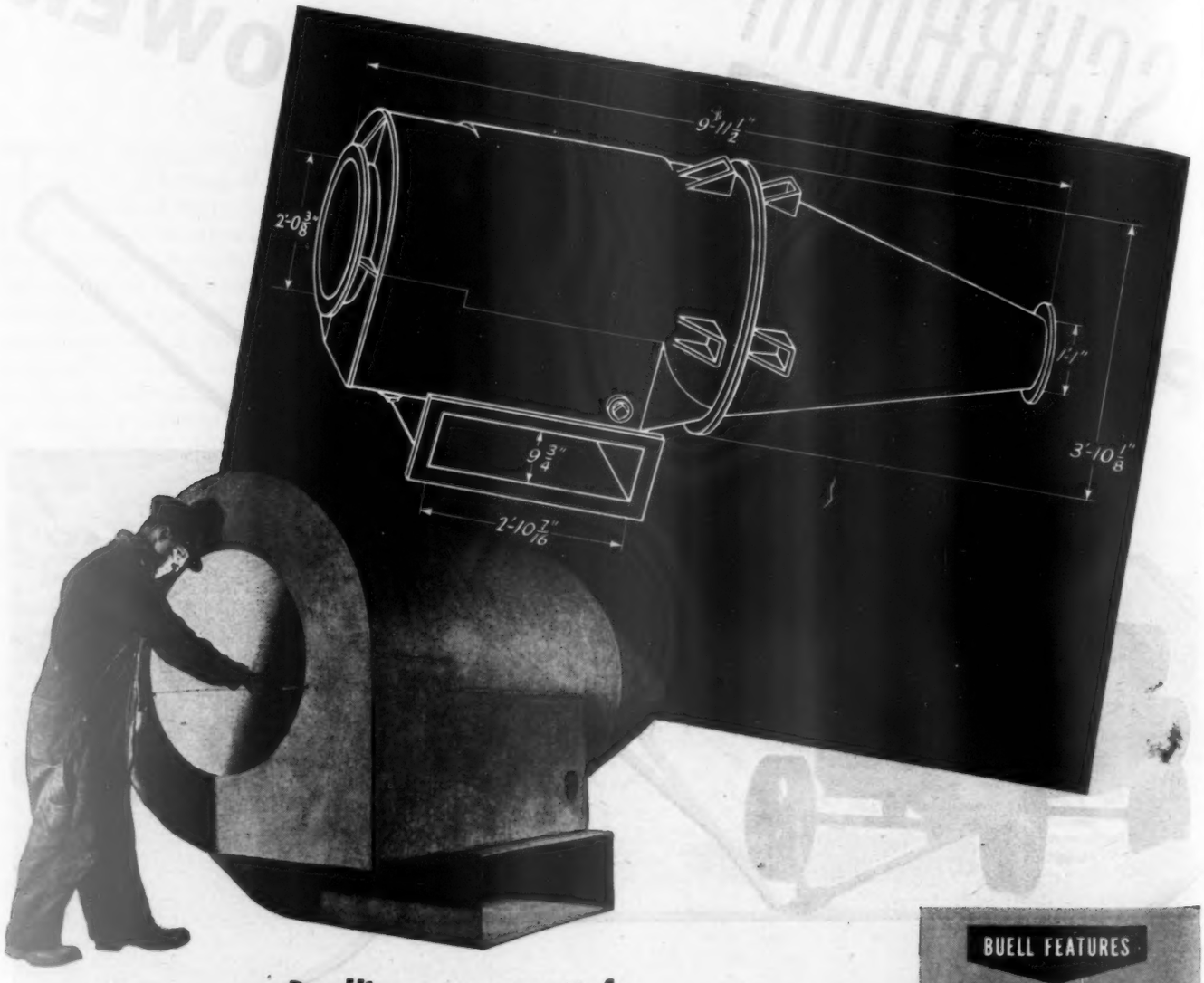
SCHRAMM INC.

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

LARGE DIAMETERS



Buell's assurance of
HIGH EFFICIENCY, LOW MAINTENANCE, LONG LIFE

THE DECIDED ADVANTAGES of Buell's large diameter cyclones, made possible by the patented "Shave-Off", definitely reflect industry's growing preference for Buell (van Tongeren) Dust Recovery Systems.

Large diameters make possible a collection operation with low centrifugal force and permit construction of extra thick steel. This accomplishes two things: minimum abrasion and long life. *Large diameters* afford large dust outlets, making clogging practically nil. *Large diameter* cyclones have the added advantage of handling a given gas volume with fewer units.

Engineers who look to low cost up-keep and continuous operation as prime requisites in dust recovery should give these factors serious consideration.

BUELL FEATURES

SHAVE-OFF
LARGE DIAMETERS
EXTRA-STURDY CONSTRUCTION
CORRECT HOPPER DESIGN
SPLIT-DUCT MANIFOLDS
INNER WELDS GROUND SMOOTH

RESULT IN

HIGH COLLECTION EFFICIENCY
LESS FAN BLADE WEAR
LOW DRAFT LOSS
LOW POWER CONSUMPTION
HIGH TEMPERATURE RESISTANCE
UNLIMITED CAPACITY
NO MOVING PARTS
FREE DUST FLOW

PRODUCE

HIGH EFFICIENCY
LOW MAINTENANCE
LOW OPERATING COST
LONG LIFE
NO CLOGGING

buell
DUST RECOVERY SYSTEMS

Engineers and plant executives are invited to write for Buell's factual 28-page book:
"The van Tongeren System of Industrial Dust Recovery."

BUELL ENGINEERING COMPANY, INC.
Suite 5000, 12 Cedar Street, New York 5, N. Y.
Sales Representatives in Principal Cities

DESIGNED TO DO A JOB, NOT JUST TO MEET A "SPEC"

Justice Department Charges Cement Group With Price Fixing

In a complaint filed at Denver the Justice Department charged that the Cement Institute of Chicago and 89 member companies had illegally fixed Portland cement prices throughout the United States. The accused firms, which operate 400 plants in 35 states, are also charged with standardizing the quality of their products, the terms of payment and price changes. The complaint requested that the Cement Institute be dissolved and that the members quote prices and sell cement either f.o.b. mill or on a delivered price basis at the option of the purchaser.

Wolverine Portland Cemen Reopens Coldwater Plant

An increased demand for cement caused the Wolverine Portland Cement Company, Kalamazoo, Michigan, to announce that it would reopen its plant at Coldwater in the near future. The Coldwater plant, when re-opened, will be closely coordinated with the Quincy plant. Modernization and improvement of both will continue; and the management has announced that several attractive features will be offered to employees and to new members of the personnel. Officials anticipate a payroll exceeding any other in the company's history.

Food Adm. Makes Icebox Of Old Limestone Mine

An abandoned limestone mine near Atchison, Kansas, has been put to use by the War Food Administration as an underground refrigerated storage room for perishable food. Three 250-ton refrigeration compressors were used in the 9,000,000-cubic-foot mine to reduce the temperature to 30 degrees. It is estimated that there will be room for 3,000 carloads of supplies in the cavern, which is located near the banks of the Missouri river.

Material Service Corp. Reopens Old Quarries

Quarries at Fairmount, Illinois, idle for the last ten years, have been reopened by the Material Service Corporation of Chicago, the present owners, to meet the increasing demand for agricultural limestone and material for highway construction. In former years the output of the quarries was shipped to the United States Steel Corporation mills, to be used as flux in reducing ore. Present operations—removing topsoil, blasting and crushing—are reported to be resulting in the production of 100 tons of crushed stone per hour.

Portland Cement Assn. Names 3 to New Jobs

The following new assignments of Portland Cement Association staff personnel have been announced by William M. Kinney, general manager of the association: M. J. McMillan, regional manager of the eastern offices, New York City; James E. Dunn, manager of the Washington, D. C., office; Gordon S. Maynard, district engineer, with headquarters at Richmond, Virginia.

During the first quarter of 1945 gypsum output continued the downtrend. Domestic crude and calcined gypsum were 8 and 14 per cent. lower, respectively, than during the January-to-May period in 1944.

Sand & Gravel Assn. Announces Winners In Safety Contest

The Orange No. 14 plant of the Consolidated Rock Products Company of Los Angeles and the Quigley plant of the Fort Worth Sand & Gravel Company, Inc., were dual winners of the 16th annual National Sand and Gravel Association safety competition. In the safety drive, sponsored by the Bureau of Mines, the Orange dry-pit plant at Orange, California, won the 1944 trophy in the group of plants with 100,000 or more man-hours of exposure. The total number of man-hours was 103,204, with only one temporary injury, resulting in 3 days of lost time. The Quigley wet-pit operation at Hurst, Texas, took first place in the group having less than 100,000 man-hours of exposure. The plant worked 96,142 man-hours without a disabling injury during 1944.

Minnesota Bill Passed To Raise Compensation

With the passage of a bill amending the Minnesota workmen's compensation act, wage loss benefits were increased 20 per cent. Persons disabled by accidents now will receive a maximum of $24 a week in place of $20. The legislature authorized the additional payment of $2,500 to widows of workers killed while on duty if there are minor children still in school.

V. S. Tjossem Elected Officer of Seattle Firm

In the annual elections held recently by the stockholders of the Pioneer Sand & Gravel Company of Seattle, Vance S. Tjossem was elected vice-president. He and Claude L. Golding were named directors at the directors' board meeting.

Treasury Dept. Wins Tax Case Decision Against Wyoming Firm

Taxes levied against the Standard Bentonite Company of Wyoming as an association in 1940, 1941 and 1942 were sustained by Federal Circuit Court Judge S. G. Bratton in an opinion affirming an earlier district court judgment. Judge Bratton ruled that the taxable character of a trust is determined by the terms of the trust declaration and not by the extent to which administrative or other power is exerted under these terms. The trustees had contended that the trust company, although the terms of its trust declaration provided it with the attributes of an association, had not exerted the powers under these terms and should therefore be taxed as individuals.

Survey of St. Louis Area To List Mineral Supplies

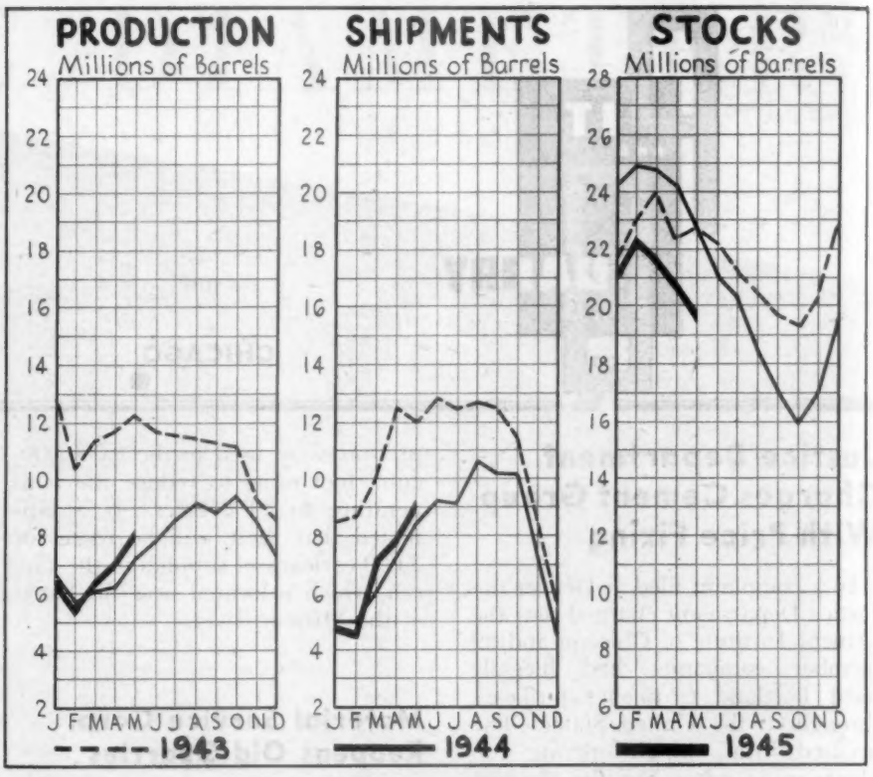
Dr. Norman Hinchey, assistant professor of the department of geology at Washington University, St. Louis, Missouri, has been appointed to conduct the field investigation of industrial mineral resources in the St. Louis area. The survey, supervised by the Missouri Geological Survey and Water Resources and the local division of the Bureau of Mines, was prompted by the probable mineral needs of this region during the conversion of manufacturing facilities from a war-time to a peacetime basis. Dr. Hinchey will examine various mineral deposits, such as limestones and dolomites.

Operations to Begin At New Kansas Quarry

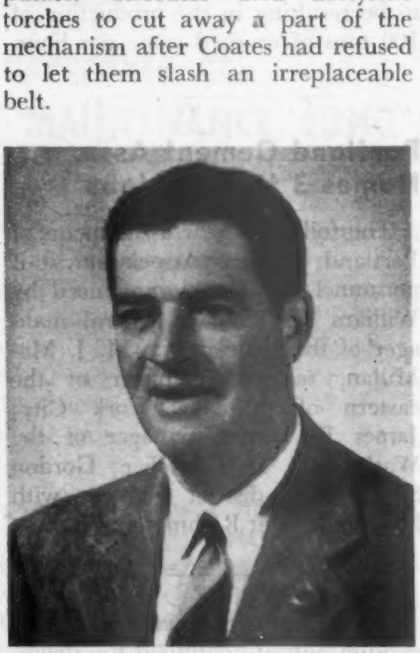
A new quarry has been opened and operations have been begun by the Hayes Construction Company near Junction City, Kansas. Agstone will be produced at the rate of 50 tons an hour at the $35,000 plant. Fifteen of the 20 trucks have been equipped with limestone spreaders.

Accident Victim Directs Own Rescue

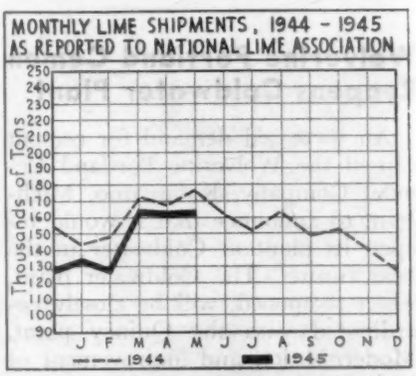
Pittsburgh pedestrians watched for more than an hour as Thomas Coates, an employee of a slag products company, directed rescuers in freeing him from a conveyor at the top of a 94-foot hopper. The victim's arm had been caught in the machine as he walked up a runway. Although the motors were shut off at once, the injured man's arm was so badly crushed that it was necessary to amputate. Rescuers used acetylene torches to cut away a part of the mechanism after Coates had refused to let them slash an irreplaceable belt.



Output of 8,086,000 barrels of finished cement during May, 1945, reported to the Bureau of Mines, United States Department of the Interior was 13 per cent. above the output in May, 1944, and 14 per cent. above April, 1945. The upswing in the long term trend, although slight, has continued for the past three months. The increased production is attributed to the partial relaxation of government controls over construction activity and the usual seasonal trend of larger output through the spring and summer months. Demands in May, as in the previous month, were greater than production, and stocks on May 31 were 1,186,000 barrels below the April, 1945, total. Mill shipments of 9,272,000 barrels were 6 per cent. above May, 1944. Mill stocks of finished cement at the end of May totaled 19,601,000 barrels, a decline of 13 per cent. from the stocks of May, 1944.



Quentin W. Best, whose promotion to the vice-presidency of the Consolidated Rock Products Company of Los Angeles was reported in the July issue of PIT AND QUARRY.



According to data collected by the National Lime Association, 54 companies in May, 1945, shipped 161,831 tons of lime (93,825 quicklime; 68,006 hydrate). Reporting companies represent 45.7 per cent. of the association members' total capacity of record. Based on Pit and Quarry's estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 390,000 tons. Shipments of lime by users for May, 1945, were:

Use	Quicklime (tons)	Hydrate (tons)
Agricultural	3,585	24,125
Building	6,254	19,883
Chemical	83,986	23,998
Total	93,825	68,006

BUY MORE BONDS

Rich Gypsum Deposit In Bitterwater Area Again Being Worked

Production of agricultural gypsum was begun recently by the Monterey Gypsum Company in the Bitterwater area, Benito County, California. The rich deposit, which was opened in 1898, has been worked only intermittently. The new operators, Walter and Jack Wilkinson and H. B. Scott, have installed a large mill and crusher, storage bins and a sacking machine. They expect to produce about 200 tons of high-grade sacked gypsum per day.

Ruberoid Greets Workers With Welcome Booklet

A policy of cordiality toward new employees is responsible for a 20-page booklet, *Welcome to Ruberoid,* which is handed to new workers at the eleven Ruberoid Company plants. The attractive pamphlet contains a brief illustrated history and description of the concern. Ruberoid purchased extensive asbestos mining properties at Eden and Lowell, Vermont, in 1936.

Fire at Indiana Plant Causes $75,000 Damage

Fire of an unknown origin destroyed the plant of the Salem Lime & Stone Company at Salem, Indiana, causing a loss to the firm of approximately $75,000. In addition to the equipment at the plant, all the machinery moved from the Bedford Rock Wool Company, Bedford, Indiana, upon its merger with the Salem firm last February also was destroyed. The combined industry owned by the Ric-Wil Company of Cleveland, was operated by Floyd H. Colvin, president and general manager of the Salem firm.

The plant is to be rebuilt as soon as material and machinery can be secured. The firm will expand facilities to include the production of rock wool for pipe insulation.

Adams Gustin Named To Universal Atlas Staff

Universal Atlas Cement Company has announced two changes in staff personnel. James M. Adams, formerly assistant sales manager at the Waco, Texas, plant, was named to succeed C. H. Boice as sales manager. Mr. Boice retired July 1 after 29 years of continuous service. J. A. Gustin was appointed assistant manager of the Osborn, Ohio, plant.

U. S. Salt Production Tops 15 Million Tons

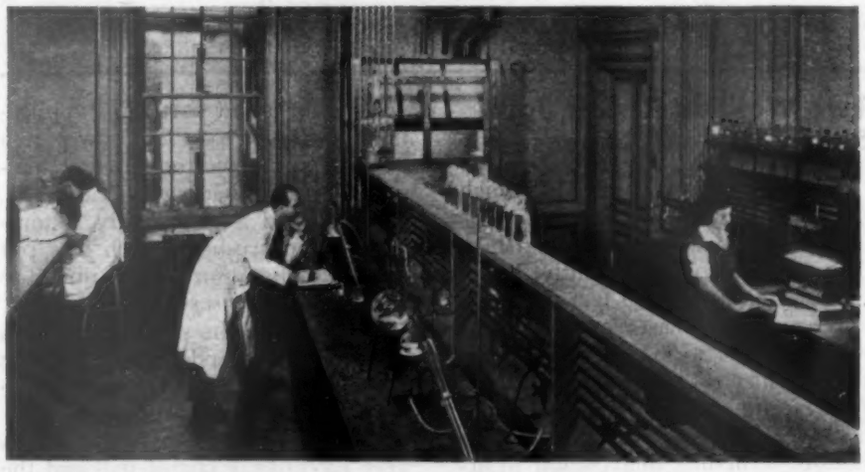
The 1944 salt production of the United States reached an impressive total of 15,717,171 short tons, representing a value of $45,989,264. The Bureau of Mines points out that there was an increase of 3 per cent. in quality and 5 per cent. in value compared with totals of 1943.

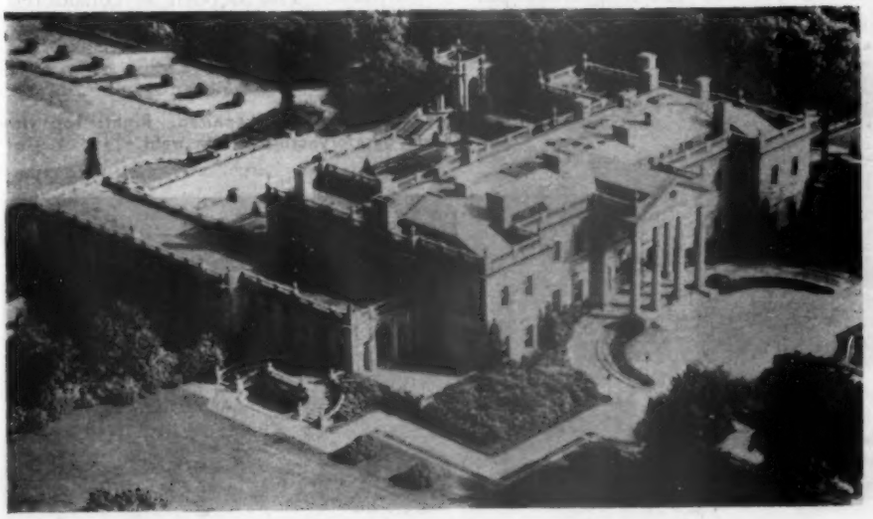
Agreement Reached By Two Companies On Similar Patents

The Warner Company announced that an agreement has been reached for cross licensing patented processes used by its staff and that of the G. & W. H. Corson Company in manufacturing pressure hydrated limes. Both firms had been working simultaneously, but unknown to each other, on a pressure process for hydrating lime to improve its qualities, especially in making masonry mortar. Patents were granted as follows: to the Corson Company for its Miracle Lime and to the Warner Company for Super-Limoid. By means of an agreement between the two firms, the best features of the processes can be adopted.

New $100,000 Plant To House Phosphate Firm

The Simplot Fertilizer Company of Pocatello, Idaho, announces that construction work on its $100,000 phosphate rock crushing plant has begun. The building will be a steel and reinforced concrete structure.





Eighty trained specialists are conducting research studies for the Pennsylvania Salt Manufacturing Company at Whitemarsh Hall, former home of E. T. Stotesbury at Whitemarsh, Pennsylvania. The 130-room mansion was acquired by the company to house its laboratories and staff—known as the Whitemarsh Research Laboratories—and to provide the equipment for testing materials used in chemicals for agriculture, water and sewage systems, metal industries, ceramics, glass and other related fields. The Pennsylvania Salt Manufacturing Company, founded in 1850 for the "manufacture of lye and the alkaline salts of soda," built its first plant at Natrona, Pennsylvania.

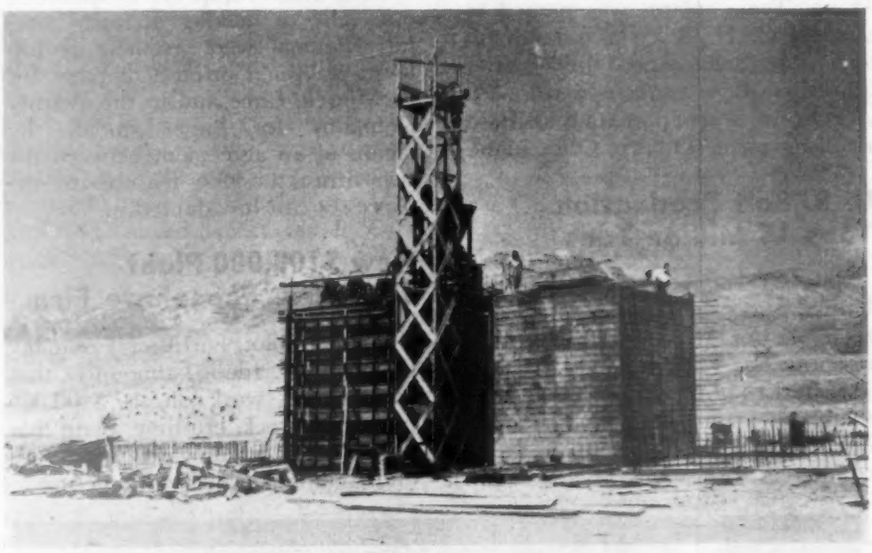
Left: An aerial view of Whitemarsh Hall.

Above: One of the Whitemarsh Hall laboratories.

New Sand & Gravel Plant of Kern Rock To Double Capacity

Construction now is under way on the new Kern Rock Company sand-and-gravel plant near Bakersfield, California. The plant will have a productive capacity of approximately 400 tons per hour, about double that of the old Kern plant, which is to be abandoned after ten or twelve years' steady operation because of the depletion of the deposit.

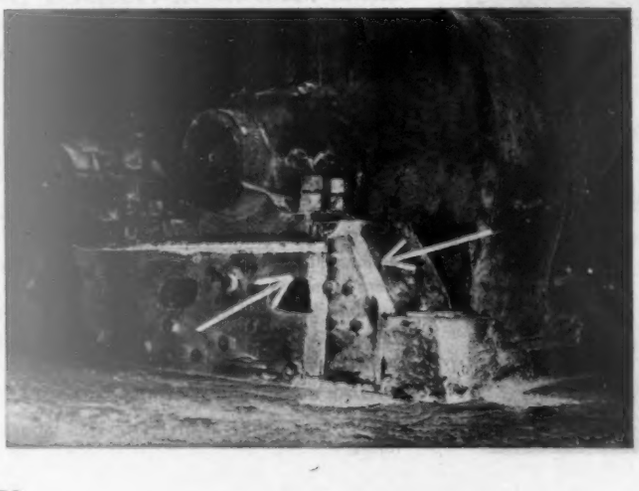
Located on Cottonwood Creek about 12 miles due east of Bakersfield, the new plant, of all-steel and concrete construction, is expected to start operations late in the autumn. It was designed by Dan Sill, general superintendent of the Kern Rock Company, and incorporates a number of unusual features, chief of which will be the ability to keep structures and operating equipment clean and shipshape with the expenditure of little effort.



Two Welding Repair Jobs Save Time and Expense

Two large repair jobs in which the use of Eutectic welding saved expensive repairs and possible shutdowns were reported recently. When a crack more than 10 feet in length appeared in the cast-iron barrel and diaphragm of a 56,000-pound gyratory crusher of an Alabama cement factory, the company was faced with a choice between tearing down the housing structure, unavoidable in ordinary welding jobs, or delaying production for four months while waiting for a new part. The application of EutecTrode 24, however, a coated special electrode for low temperature arc welding of cast iron, accomplished a satisfactory restoration of the crusher, which was put back into operation and continued to give satisfactory service.

A little later the same plant again utilized EutecTrode 24—this time to weld breaks in the cast-iron base of a train of gears and bearings supporting a 250-ton kiln. The repairs were successfully completed, and the machinery has given perfect performance for several months.



Left: Base of 250-ton kiln successfully repaired. Right: Top view of 28-ton gyratory crusher with weld.

California Plant Modernizes Set-up With New Equipment

The Rockdale, California, aggregates plant of the Grant Pacific Rock Company, Fresno, at present under lease to the Pacific Coast Aggregates Company of San Francisco, is being improved by the addition of two new Symons cone crushers. These units are replacing an old disk crusher and will greatly increase the plant's production capacity of crushed material.

Three vibrating screens are also being installed, according to A. H. Sienknecht, superintendent.

Cement Mill Shipped To Cuba from New Jersey

A cement mill moved from New Jersey to Cuba when the Freeport Sulphur Company purchased the equipment of an old cement mill at Piscataway, dismantled the plant and shipped the machinery to Nicaro, Cuba. The sulphur firm acquired the property in 1943 and has now completed work on its overseas mill at the new location. The old mill, abandoned in 1919, yielded 1,400 tons of structural steel.

Expect Heavy Shipments From Diatomite Deposit

Development of a deposit of diatomaceous earth near Basalt, Nevada, by the Dicalite Division of the Great Lakes Carbon Corporation has resulted in the repairing of loading platforms of the Tonopah & Goldfield Railroad at Coaldale. At this point the heavy shipments of diatomite will be received and shipped. The deposit is considered one of the purest in Nevada.

Value of Construction In First Half of 1945 Over $2,000,000,000

War Production Board statistics show that the value of new construction activity in the United States during June, 1945, amounted to a total of $403,000,000, a 4 per cent. increase over figures for May and a 19 per cent. increase over the value of construction during June, 1944. The board also reported that the volume of new construction for the first six months of 1945 had reached a total of $2,049,000,000.

Announce 1946 Exhibit Featuring New Products

The first annual "Products of Tomorrow Exposition," an international project, has been approved by the Office of Defense Transportation, which will assign a date for the opening of the event early in 1946 in Chicago. Plans have been completed for the use of 1,000,000 square feet of floor space to accommodate the exhibits.

Oklahoma Plant Sued For Accident Damages

Defendants in a damage suit for $16,175 were the Makins Sand & Gravel Company of Oklahoma City and the Oklahoma Railway Company. The plaintiff, Letha Burkhalter, a passenger on the railway's bus, sued to recover for injuries received when the vehicle collided with a Makins truck.

Indiana Cement Concern Closes After 45 Years

The dissolution of the Wabash Portland Cement Company as a corporation has been announced at Stroh, Indiana, scene of the establishment of the firm 45 years ago by Emil Stroh. For the last 15 years the plant has been operated only intermittently, although work has continued at the Osborn, Ohio, plant.

Celotex Plant at Lagros To Make Rock-Wool Tile

R. N. Rogers, plant manager for Celotex Corporation at Lagros, Indiana, has announced that the company's rock wool plant there soon would be enlarged to accommodate facilities for the manufacture of rock wool tile. The new product is used as an acoustical block in hospitals.

Hy-Rock Products Co. Sold by R. W. Meisinger

Ownership of the Hy-Rock Products Company, Marengo, Indiana, has been transferred by R. W. Meisinger of Evansville, former proprietor, to Glenn Bowen of Paoli, Indiana. Mr. Bowen, a former superintendent of a state highway subdistrict department, plans to expand the quarry, which supplies slate, agricultural limestone, crushed stone and other stone products to users throughout a wide area.

Quarry Water Rights Sought for Lima, Ohio

The city council of Lima, Ohio, has authorized Mayor W. L. Ferguson to contract with the National Lime & Stone Company of Findlay, Ohio, for water rights at an abandoned quarry. In a recent emergency the quarry served the city as a reserve source of water.

Golden Cycle Corporation Buys Out Thomas & Brown

The Thomas & Brown Lime Company of Pueblo, Colorado, has announced the sale of its lime kiln and holdings in Manitou Springs to the Golden Cycle Corporation. The new owners will operate the kiln and quarry for their own use and for customers.

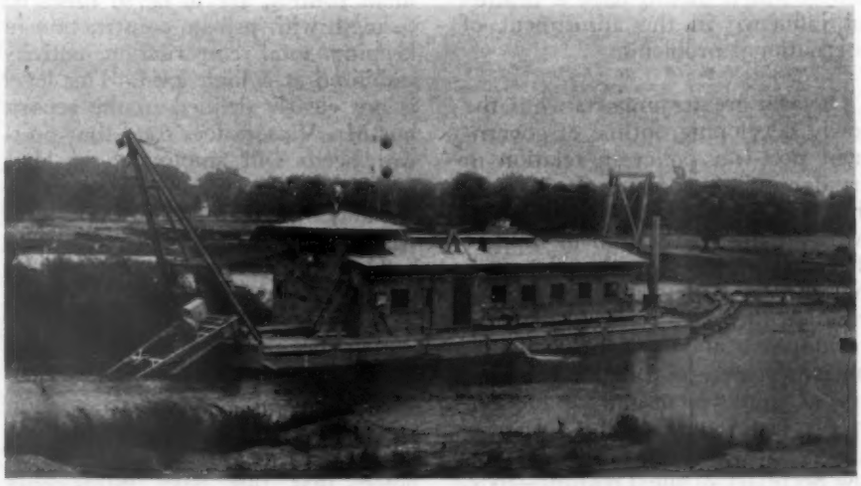
Gildemeister Co. Begins Operation of New Limestone Plant

S. T. Gildemeister, of Gildemeister & Company, Ltd., Santiago, Chile, has announced that the firm's new limestone plant will begin production this month. Material will be obtained from a rich limestone deposit, estimated to contain over 50,000,000 tons of carbonate, which was acquired by the company in 1944. Mr. Gildemeister stated that arrangements had been made with the Kennedy-VanSaun Manufacturing and Engineering Corporation, New York City, for the construction and delivery of machinery for a complete cement plant with a 200,000-ton annual capacity.

Open New Office After Columbia Chemical Deal

One of the new developments following the acquisition of the Pacific Alkali Company of Bartlett, California, by the Columbia Chemical Division of the Pittsburgh Plate Glass Company was the opening of a new district sales office recently in San Francisco. The new office, in charge of I. G. Stewart, was installed to serve buyers of heavy chemicals in the area.

Lehigh Portland Cement Company's plant at Mitchell, Indiana, has resumed operations after a five-week shut-down for repairs. The major project during this period was the overhauling of the plant's large steam turbine.



Equipment such as this, a 12-inch hydraulic dredge built by the American Steel Dredge Company, Inc., has been used by United States Army engineers for dredging operations in all war theaters. The dredge, which is mounted on a pre-fabricated steel hull, handles sand, clay or silt to a depth of 16 feet and delivers material through a maximum of 1,000 feet of discharge line at water level or 500 feet at 30 feet elevation. It is powered by a Caterpillar Diesel D17,000 electric set.

WASHINGTON NEWS LETTER

WITH Senate ratification of the San Francisco charter, the United States has now accepted the international responsibilities of a great power. Even more significant than the overwhelming margin by which Senate approval was voted is the fact that, without exception, all the measures providing the economic implements essential to effective international co-operation have successfully run the Congressional gantlet. President Truman's unequivocal sponsorship and support, a gradual recognition by the legislators of the great weight of public opinion, the reintroduction of party discipline by Mr. Hannegan, and the emergence of what may be a new sense of realism in the halls of the Congress, stand out as the primary factors behind the passage of additional tariff-reduction authority, approval of American participation in the new international monetary and lending agencies, five-fold expansion of the lending authority of the Export-Import Bank, and repeal of the prohibition of United States credits to nations in default on World War I debts. In recognizing the interrelationship of economic and political co-operation, the Congress has taken a long step in the withdrawal from our traditional isolationism; in essence, this recognition spells the emergence of the United States from its semi-serious, more or less experimentalist attitude toward participation in world affairs, and invests our position with stature and a purposefulness which should have a healthful influence in the adjustment of international problems.

* * *

Of even greater importance is the slowly developing outline of government post-war policy in relation to the domestic economy. It is probably true although no strong argument for the isolationism in support of which it is frequently advanced, that the most important single contribution this country could make to world peace and security would be the achievement of a high and stable level of employment and production. In his last report to the Congress as O.W.M.R. director, Mr. Vinson—now Secretary of the Treasury—took up the economic problems we will face after the defeat of Japan, laying particular stress upon the twin reefs of inflation-deflation which the economy will have to navigate when the Pacific war comes to its inevitable end. According to Mr. Vinson, there is only one proper course to take: prompt expansion of national output to increase the supply of goods on the one hand and reëmployment on the other. Those controls which can contribute to the achievement of this end should be retained, and those that are unnecessary, promptly eliminated. But more positive measures may also be required. "If reëmployment is slow, if a deflation spiral threatens, then the government must be prepared to take positive action to bolster income and create jobs through public works." In other words, government spending for public works is to be used to supplement private business activity in order to provide the requisite level of national income and employment. And full employment is to be regarded as "the necessary responsibility of government." The heavy reliance placed upon the stimulating function of the construction industry has important implications for the role of that industry in the post-war economy. Mr. Vinson recommends that the government budget be formulated in relation to the total national budget, in line with the budgetary planning principle contained in the full-employment bill now before the Senate, and that government taxing and spending policy be determined in terms of the inflationary and deflationary needs of the economy.

Public-works expenditures, which are, of course, under direct government control, are to be so timed as to mesh with private construction in keeping total construction activity stabilized at a high level. This level is not clearly defined in the report, but Mr. Vinson does state that post-war needs will amount to at least $15,000,000,000 per year, and presumably government expenditures will fill in any gap which develops between private construction and the required annual rate. This would mean that the O.W.M.R. had accepted the stabilization level of construction activity recently proposed by the National Planning Association and discussed on this page four months ago. However, it should be noted that this level refers only to new construction; maintenance expenditures would account for $6,000,000,000 more, bringing the total for all construction activity to $21,000,000,000. The significance of the support of this level by public-works spending is evident from a comparison with the record-breaking war-time years when the peak annual figure reached was only $13,000,000,000 of new construction and $4,000,000,000 of maintenance; and with the building boom years of 1925-1929, when the value of new construction hovered between $10,000,000,000 and $11,000,000,000 per year, while annual maintenance was about $3,000,000,000.

Other government activities are to be designed to encourage a very large increase in the volume of private residential construction: wide dissemination of information on population growth and movements, vacancies, costs, prices, and other factors influencing the building market, government promotion and advancement of scientific city planning, efficient construction techniques, and the application of modern architecture to residential building. Finally, the concern of the O.W.M.R. for using governmental powers to create conditions propitious to adequate employment is evidenced by the announcement that during the reconversion period, until restrictions can be lifted on all construction, the War Production Board is to give preference to the most urgently needed projects—"especially those contributing to large-scale future employment."

The dicta of the O.W.M.R. carry so much weight in Washington administrative circles as well as in the Congress that for all practical purposes the ideas contained in its report may be considered official Administration policy. Mr. Vinson's replacement by John W. Snyder, who served as Federal Loan Administrator for only a few short months before his new appointment, is not expected to make much difference in O.W.M.R. policies, although Mr. Snyder, a former St. Louis banker, is probably more middle-of-the-road-ish than his predecessor. Government planning activities, particularly as they relate to the integration of public and private spending, will probably be subjected to closer scrutiny under Mr. Snyder, and his endorsement may be more reluctantly given than Judge Vinson's, but in the absence of practical alternatives, it is doubtful whether he will diverge very much from the line already laid down.

the VICTORY *Program*

. . . . . AND YOUR BUSINESS

CAPITAL ADDITIONS.— The question has been raised whether a producer under Order P-56 could place an unrated order for capital additions without authorization from the War Production Board. In a letter addressed June 12 to V. P. Ahearn, Executive Secretary of the National Sand & Gravel Association, Marcellus H. Stow, deputy director of the Mining Division of the War Production Board, said in part:

. . . "There are no restrictions in Order P-56 that prevent a mine operator from purchasing capital equipment on an unrated basis. Therefore, a mine operator is entirely at liberty to purchase machinery and equipment without making application to the Mining Division for a preference rating, if such equipment is available for delivery without preference ratings."

CONSTRUCTION MACHINERY.— A method by which manufacturers of construction machinery and Diesel engines may continue to use military allotments of controlled materials and preference ratings that they have received from their customers in the production of these items for civilian use after the customer has canceled the order was outlined July 10 by the War Production Board. The instructions are contained in Direction 70 (Military Cancellations) to Controlled Materials Plan Regulation 1, as amended today.

The amended direction is intended to minimize the rescheduling and reordering that otherwise would be necessary in connection with the change from military to civilian production.

Direction 70, issued June 7, previously gave instructions for a manufacturer's handling of military cancellations of Class A civilian type and products, which are a limited list of products for which both the claimant agencies and the W.P.B. allot controlled materials.

The amended direction applies only to the manufacturer of the complete product listed below and not to the manufacturer of any component of any such product:

CMP Code 308, Construction equipment, tractor-mounted.

CMP Code 309, Construction machinery, specialized.

CMP Code 310, Construction material mixers, pavers, spreaders, related equipment.

CMP Code 311, Construction-material processing equipment.

CMP Code 312, Power cranes, derricks, draglines, dredges, shovels and related equipment.

CMP Code 313, Scrapers, maintainers, and graders.

CMP Code 316, Drilling, boring machinery: earth, rock, including water-well drilling.

CMP Code 470, Tractors, track-laying.

CMP Code 750, Diesel-electric or Diesel-mechanical locomotives, under 600 horsepower.

A detailed description of the above products is contained in the W.P.B. publication *Products and Priorities.*

GASOLINE DELIVERY RECORDS.— Industrial users of non-highway gasoline rations who use E and R coupons in buying gasoline at scattered points may be exempted from maintaining delivery records, the Office of Price Administration announced June 27.

Some of these users have found it difficult to distribute the delivery records, require their maintenance by employees, collect them and then compile the information to present to the boards in time for renewals, the agency said.

O.P.A. district directors will be authorized to grant exemptions from the record-keeping requirement on the basis of applications that set forth the following conditions:

1. The applicant has been issued non-highway gasoline rations for use in 10 or more separate machines or pieces of equipment by 10 or more employees who obtain their supplies of gasoline with E and R coupons at 10 or more different locations.

2. The industrial user has an adequate accountability system for controlling the use of E and R coupons and preventing improper use of the ration.

M.R.O. PURCHASES.— The procedure to be followed by producers in applying for supplemental M.R.O. quotas under Order P-56 has recently been described by Fred M. Chace, chief, Non-Metallic Section, Mining Division, War Production Board, in a letter dated July 7 and reproduced almost in its entirety below:

According to Preference Rating Order P-56 as amended June 30, 1945, under paragraph (c) (1), you are granted an automatic quota of 120 per cent. of your aggregate expenditures for maintenance, repair and operating supplies and minor capital additions during the corresponding calendar quarter of 1943. Including in this quota, in terms of dollar value, are all your controlled materials, such as carbon steel, alloy steel and copper materials. These are to be calculated in terms of dollar value rather than in terms of weight for purposes of inclusion in your maintenance, repair and operating supply quota.

The following is an explanation of how to compute your quarterly quotas since Preference Dating Order P-56 was amended on April 5, 1944.

(1) Make a study of your purchase order books of the like calendar quarter of 1943 and from those books ascertain every item purchased for the purpose of maintenance, repair and operating supplies and minor capital additions (capital equipment costing less than $500), whether you applied a preference rating or not, or whether you used your allotment symbol or not. You may include in this tabulation coal, fuel and lubricating oil, purchased electric power, water, explosives, etc., which were never included before. When you have arrived at the total dollar value spent for this quarter, you multiply the total by 120 per cent., and you will have arrived at your dollar value quota for the like calendar quarter of 1945 and any subsequent like calendar quarters. For these items you have an endorsable AA-1 rating, and an endorsable S-7 allotment symbol for controlled materials.

(2) Note that your entire quota is a dollar value quota and may be spent as you see fit for any items you use for maintenance, repair and operating supplies, whether controlled materials or not, or whether you apply a rating or not. Your three restrictions are (a) that the items are for maintenance, repair and operating supplies or minor capital additions, (b) that you may not exceed the sum provided for the quarter and (c) paragraph (h)—Inventories, use and resale of materials.

(3) There are no restrictions for placing advance orders as far as advance as you choose, providing you have figured your quota for the quarter involved and stay within that quota.

(4) Paragraph (m) provides that if you find, because of some extraordinary circumstances, you have not sufficient dollar value to operate properly your serialized enterprise you may apply by letter in duplicate for additional quota. State in that letter the dollar value of the quota you have for the quarter, the additional dollar value you need, and the purpose of the need. There is little doubt that, if the need is justified, you will be authorized the additional amount requested.

In the event that you find your dollar value quota for the corresponding quarter is insufficient, you may apply to the Mining Division for a supplemental quota as explained in paragraph (4) above.

P-56 REVISED.— The P-56 order, under which the mining industry operates, was amended again on June 30, the first revision made in nearly a year. The full text of the amended order follows, the changed portions being indicated by underscoring:

PART 3201—MINING

[Preference Rating Order P-56, as Amended June 30, 1945]

MINES AND SMELTERS

§ 3201.11 *Preference Rating Order P-56*— (a) *Purpose and scope.* This order explains how operators of mines and smelters in the United States and in foreign countries may get the materials and products they need to carry on their operations. The materials covered include not only maintenance, repair, and operating supplies, including controlled materials, but also machinery, other kinds of materials, and equipment.

(b) *Definitions.* (1) "Producer" means a person operating any of the following enterprises, whether in the United States, or any of its territories, or in a foreign country (i) any plant actually engaged in the extraction by surface, open-pit, or underground methods, or in the beneficiation, concentration, or preparation for shipment of the products of mining activity; (ii) any plant wholly engaged in the processing and burning of refractories; (iii) any plant producing any material listel below by smelting or refining processes, and to whom a serial number has been issued under Preference Rating Order P-73, or is hereafter issued as provided in paragraph (c):

Antimony	Nickel
Cobalt	Platinum
Copper	Tin
Iridium	Tungsten
Lead	Vanadium
Mercury	Zinc
Molybdenum	

(iv) any prospecting enterprise for the discovery, exploration, or development of new or additional mining projects including the construction of access roads; and (v) mines, concentrating mills, smelters, railroads, power plants, refineries, and appurtenances owned and operated by the companies holding serial numbers under Preference Rating Order No. P-58 on December 24, 1943.

(2) "District" means a mine supply control district of the Foreign Economic Administration.

(3) "Maintenance, repair, and operating supplies" means material used for the following purposes by producers in the conduct of enterprises described above in paragraph (b) (1): (i) minimum upkeep necessary to continue the working condition of essential property or equipment, and (ii) restoration of essential property or equipment to a sound working condition after wear and tear, damage, destruction or failure of parts, or the like have made the property or equipment unfit or unsafe for service; and supplies which are essential to and consumed or worn out in the conduct of such enterprises. In addition, except as hereinafter noted, the term "maintenance repair, and operating supplies" includes minor capital additions normally necessary to the operation of the enterprise, but not exceeding in cost $500 (excluding purchaser's cost of labor) for any one complete capital addition. The term "one complete capital addition" includes a group of items customarily purchased together and all items which would normally be purchased as part of a single project or plan. No capital addition shall be subdivided for the purpose of coming within this paragraph.

Producers Holding Serial Numbers

(c) (1) *Maintenance, repair, and operating supplies for domestic producers with serial numbers.* Producers located within the United States, its territories and possessions (herein called "domestic" producers), holding serial numbers, which may be obtained in the man-

ner specified in paragraph (f), are hereby assigned a preference rating of AA-1 for the purchase of maintenance, repair, and operating supplies, other than controlled materials. This rating may be applied by the producer by placing on his delivery order the endorsement described in paragraph (g). The producer may obtain controlled materials for maintenance, repair, and operating supplies by endorsing his delivery order with the endorsement described in paragraph (g) and inserting therein the allotment symbol "S-7" and appropriate quarterly abbreviation. An order bearing this endorsement constitutes an authorized controlled material order. No serialized producer shall order for delivery during any calendar quarter, with or without preference ratings, or allotment number, maintenance, repair, or operating supplies in an aggregate amount exceeding 120 per cent. of his aggregate expenditures for maintenance, repair, and operating supplies during the corresponding calendar quarter of 1943. A producer who has several plants or other operating units which maintain separate records of maintenance, repair, and operating supplies may treat each of them separately for purposes of complying with the provisions of this paragraph (c) (1).

(2) *Maintenance, repair, and operating supplies for foreign producers with serial numbers.* Producers located outside the United States, its territories and possessions and outside of Canada (herein called "foreign" producers), holding serial numbers, which may be obtained in the manner specified in paragraph (f), may apply for priorities assistance for maintenance, repair, and operating supplies by filing the foreign mine quota application Form WPB-2937 with the Mining Division, War Production Board, Washington 25, D. C.

(3) *Machinery and equipment.* All producers holding serial numbers, whether domestic, foreign, or Canadian, may apply for priority assistance in obtaining machinery and equipment by filing Form WPB-1319 in accordance with the WPB-1319 instruction pamphlet for items of equipment listed therein. Also, for items of equipment not listed in the instruction pamphlet for which a preference rating is required without authorization on a special form, application should be made on Form WPB-1319. For items of equipment not listed in the WPB-1319 instruction pamphlet, for which orders of the War Production Board require application for specific authorization to be made on a special form, application should be made on such special form. All applications should be filed with the Mining Division, War Production Board, Washington 25, D. C., Ref. P-56, unless otherwise provided in the WPB-1319 instructions. If necessary Form WPB-1319 or the special form may be accompanied by a letter explaining any unusual circumstances. No application is necessary in the case of minor capital additions as defined in paragraph (b) (3) unless special form is required by another order of the War Production Board.

Foreign Producers Operating Under Mine Supply Control Districts

(d) *Priorities assistance for certain foreign producers operating under mine supply control districts.* To enable a producer not holding a serial number hereunder and located outside the continental United States and within the jurisdiction of a district to obtain priorities assistance, the following procedure is established:

(1) For maintenance, repair. and operating supplies a district may apply for priorities assistance by filing the foreign mine quota application Form WPB-2937 with the Mining Division, War Production Board, Washington 25, D. C., Ref: P-56. A producer not holding a serial number and located in a district may apply for priorities assistance by submitting to such district his purchase orders for maintenance, repair, or operating supplies, together with such information as may be required by the district. Within the limits of the priorities assistance granted to it pursuant to this paragraph (d) (1), such district may authenticate any such purchase order for maintenance, repair, or operating supplies by indicating the appropriate priorities assistance and countersigning the purchase order as follows:

Approved:

.....
Name of district

.....
Signature of authorized official

(2) For other machinery, materials, and equipment, a producer not holding a serial number and located within a district may submit to the War Production Board, Form WPB-1319 or any prescribed special application form, following the procedure specified for serialized producers in paragraph (c) (3), such application to be endorsed with the signed approval of the district within which the applicant is located.

(3) A distributor of maintenance, repair, or operating supplies or of other machinery, materials, or equipment used by producers, who is located outside the United States and within the jurisdiction of a district, may apply for priorities assistance in the same manner as prescribed in paragraphs (d) (1) and (d) (2) for producers not holding serial numbers and located within the jurisdiction of a district.

Other Producers Not Holding Serial Numbers

(e) (1) *Priorities assistance for other producers not holding serial numbers.* A preference rating of AA-5 is hereby assigned to delivery orders for maintenance, repair, and operating supplies (including minor capital additions as defined in paragraph (b) (3), other than controlled materials, placed by domestic producers not holding serial numbers. This rating may be applied to the producer by placing on his delivery order the endorsement described in paragraph (g). The producer may obtain controlled materials for maintenance, repair, and operating supplies by placing on his delivery order the endorsement described in paragraph (g) and inserting therein the allotment symbol "S-7" and appropriate quarterly abbreviation. An order bearing this endorsement constitutes an authorized controlled material order. No producer who uses the allotment symbol assigned by this order shall order controlled materials for delivery during any calendar quarter in an amount exceeding 120 per cent. of his aggregate expenditures for controlled materials for use as maintenance, repair, and operating supplies during the corresponding calendar quarter of 1943. Such producers may apply for higher ratings for maintenance, repair, or operating supplies exclusive of minor capital additions by filing Form WPB-2910 with the Mining Division of the War Production Board, Washington 25, D. C., Ref: P-56; and for higher ratings, or for specific authorization if such is required, for minor capital additions, such producers may apply on Form WPB-1319 or any prescribed special application form, following the procedure specified for serialized producers in paragraph (c) (3), except that Form WPB-1319 shall be filed with the War Production Board regional or district office in which is located the Technical Advisor for Mining for the area in which the enterprise is located, and only the special application form, when one is prescribed, shall be filed with the Mining Division in Washington, D. C. Such producers may apply for priorities assistance for machinery or equipment by filing Form WPB-1319 or any prescribed special application form, following the procedure specified for serialized producers in paragraph (c) (3), with the Mining Division of the War Production Board, Washington 25, D. C., Ref: P-56. Foreign producers, not holding serial numbers and not located in a mine supply control district, may apply for priorities assistance for maintenance, repair, and operating supplies, exclusive of minor capital additions, by filing Form WPB-2910 with the Mining Division of the War Production Board, Washington 25, D. C., Ref: P-56, and for machinery or equipment, including minor capital additions, by filing Form WPB-1319 or any prescribed special application form, following the procedure specified for serialized producers in paragraph (c) (3), with the Mining Division of the War Production Board, Washington 25, D. C., Ref: P-56.

Serial Numbers

(f) *Issuance of serial numbers.* Applications for serial numbers may, in the case of producers within the continental limits of the United States, be filed with the appropriate War Production Board Regional Office, Attention: Regional Technical Advisor, Mining Division; or with the appropriate State Coordinator of Mines for transmission to such Regional Advisor; or with the Mining Division, War Production Board, Washington, D. C. Serial number application by districts must be filed with the Mining Division, War Production Board, Washington 25, D. C., Rf: P-56. Applications by Canadian and all other foreign producers should also be filed with the Mining Division, War Production Board, Washington 25, D. C., Ref: P-56. In filing such application, the following forms shall be used:

Metal mines	Form WPB-1212
Coal mines	Form WPB-2784
Non-metallic mines	Form WPB-2758
Core or churn drill operators	Form WPB-2952

Smelters and refineries shall apply by letter. In issuing and cancelling serial numbers, the War Production Board will consider the importance to national defense of the present and prospective output of materials to be produced, the consumption of the critical material involved, and the importance to national defense of competing demands for such material, and competing demands for manpower and transportation. Serial numbers issued under Preference Rating Orders P-58 and P-73, and not cancelled prior to December 24, 1943, are hereby confirmed and shall be considered as having been issued under this Order P-56.

Use of Priorities Assistance; All Producers

(g) *Application and extension of priorities assistance.* The way to use preference ratings is explained in Priorities Regulation No. 3, and the way to use allotments, both in placing authorized controlled material orders and in making allotments, is explained in CMP Regulation No. 1. Instead of using the certification prescribed by those regulations or by any other regulation of the War Production Board, including Priorities Regulation No. 7, the producer may use the following endorsement signed manually or as provided in Priorities Regulation No. 7:

Allotment number .....
Preference rating .....
Order authorized under Preference Rating Order P-56, Serial No. .....

He shall not add the symbol "MRO" despite the certification instructions in CMP Regulation No. 5 or any other regulation. Requirements of other orders of the War Production Board as to special certifications remain applicable, but the foregoing endorsement shall be added to such certification. The use of the foregoing endorsement by a producer shall constitute a representation by the producer to the seller and to the War Production Board, subject to the penalties of section 35A of the United States Criminal Code (18 U. S. C. 80), that to the best of the producer's knowledge and belief he is authorized under applicable War Production Board orders and regulations to place the delivery order, to receive the items ordered for the purpose for which ordered, and to use the preference rating or allotment symbol for this purpose. Preference ratings assigned under this order for maintenance, repair, and operating supplies may not be used to obtain items on List A or List B of Priorities Regulation No. 3, except where that regulation permits the use of a P-56 rating for a particular item.

(h) *Restrictions on receipts and inventories.* Notwithstanding the provisions of any other order or regulation of the War Production Board, including CMP Regulation 2, receipts and inventories of producers shall be subject to the following restrictions only: No producer shall receive any delivery of material which will increase his inventory of such material to an amount greater than the minimum necessary to sustain his current level of operations; and the ratio of such inventory to current production shall in no event exceed the ratio of average inventory to average production for the years 1938, 1939, and 1940.

(i) *Restrictions on use and resale of material.* Notwithstanding § 944.11 of Priorities Regulation No. 1, no producer shall use any material, whether or not obtained pursuant to this order, for any purpose other than that for which priorities assistance was granted to acquire it; nor may he sell any material (including machinery and equipment), which he has used in the conduct of any enterprise described in paragraph (b) (1), whether or not he obtained such material with priorities assistance under this or any other order, except:

(1) To a producer holding a serial number hereunder, or

(2) With the written approval of the War Production Board applied for by letter to the Mining Division, or

(3) With the written approval of a district if he is a non-serialized producer located within such district. or

(4) As permitted by Priorities Regulation No. 13.

Applicability of Other Regulations and Orders

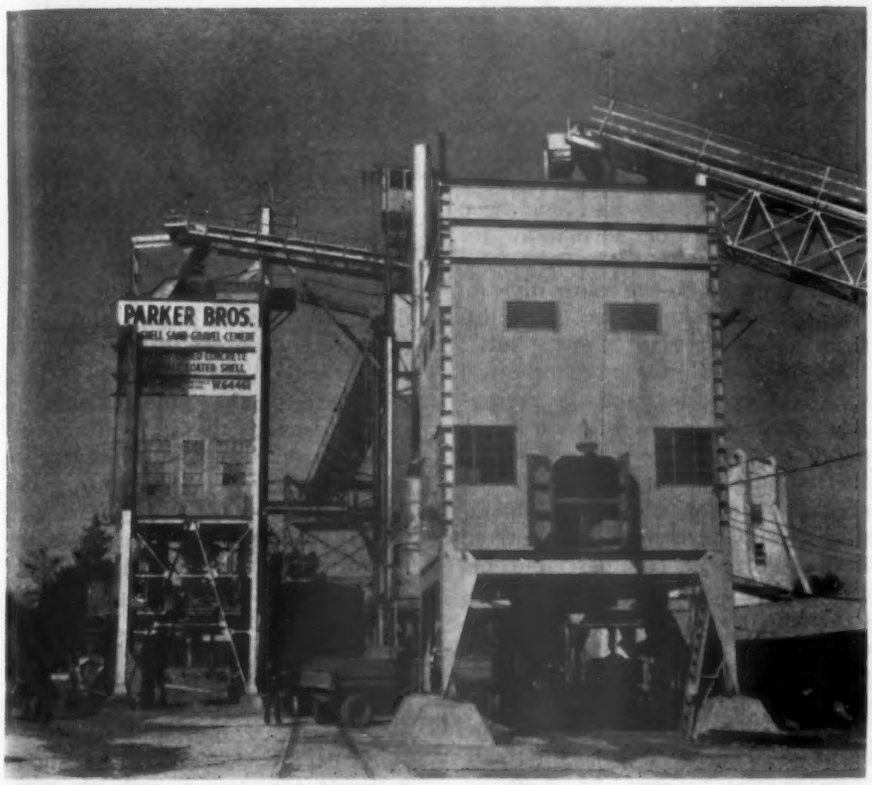
(j) (1) *CMP Regulation No. 5 and other regulations of the War Production Board.* None of the restrictions contained in CMP Regulation No. 5 shall be applicable to producers, and no producer shall obtain any material under CMP Regulation No. 5. However, privileges under other orders and regulations of War Production Board granted to persons on Schedules I and II of CMP Regulation No. 5 shall be considered as applicable to producers operating under this order. For example, Order E-5-a on gauges and precision measuring hand tools classifies a person on Schedules I and II of CMP Regulation No. 5 as an "approved user." Producers operating under Order P-56 are in the same position providing that certification clauses and all other provisions of such other orders are complied with.

(2) *Restriction on use of priorities assistance.* No serialized foreign producer or district shall acquire maintenance, repair, or operating supplies through the use of any preference rating except after having received an approved application on the foreign mine quota application Form WPB-2937, or, in the case of a non-serialized foreign producer located outside a district, on Form WPB-2910, from the Mining Division, War Production Board, Washington 25, D. C. No producer shall acquire any machinery or equipment (other than maintenance, repair, and operating supplies) through the use of any preference rating or any spe-

(*Continued on page* 70)

[1] Producers located in Canada, whether or not they hold serial numbers issued under this order, may obtain maintenance, repair, and operating supplies in the United States under Canadian order PO5B.

Oyster Shells Build Thriving Business For Parker Brothers at Houston, Texas



The recently completed ready-mix plant of Parker Brothers Company, Inc., Houston, Texas, which will augment production of shell asphalt mix.

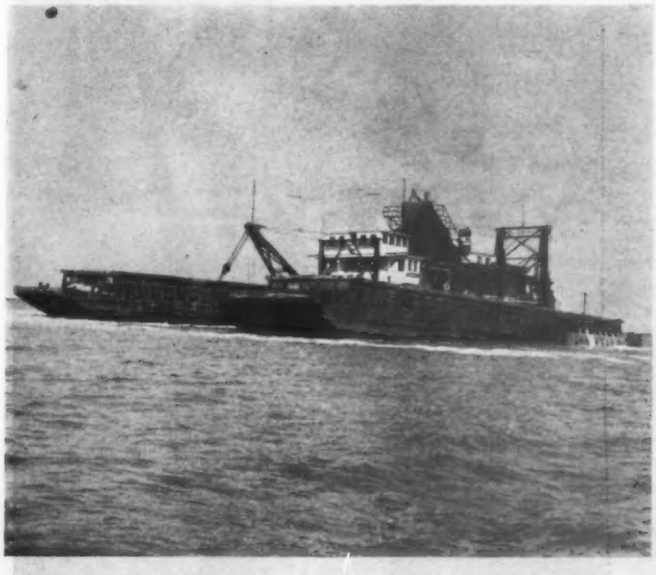
another ON THE SPOT report

UNTOLD millions of oysters that lived, died and left their shells centuries ago in the warm waters of Galveston Bay have been a vitally important factor in the development of a number of critical war industries in the Houston-Galveston area. During the war years vast quantities of pure reef shell have been dredged from the bottom of Galveston Bay to supply such important industries as Dow Magnesium and Dow Chemical Corporations, the Nyotex Chemical Company, and the Champion Paper Fiber Company, all of whom burn the shell in rotary kilns to produce lime for use in their own processes. Since the outbreak of the war the major oil companies

By WILLIAM M. AVERY

in this locality have also become important consumers of oyster shell as a result of their stepped-up production of high-octane gasoline, with the over-all result that both men and equipment have been worked at fever pitch for the past five years in an increasing effort to keep pace with the soaring demand for this critical material.

It would be a serious error, however, to create the impression that the oyster shell business is in any sense at all a "war baby." The first documented instance of the use of oyster shell in this locality—apart from the long and highly satisfactory employment by oysters themselves—harks back to the year 1880, when the city of Galveston entered into a contract with John Young to pave with oyster shell a single block of Avenue C between 22nd and 23rd Streets. Despite the fact that Young dredged the material by hand and barrow from the crest of reefs in Galveston Bay, and the raw shell was placed without any preliminary washing or screening, a reasonably



Dredge "Trinity" with two barges recovering oyster shells from Galveston Bay and Gulf coast reefs.

Mixture of shells and water discharging into barge. Swivel connection on spout makes it possible to turn barge as it is loaded.

satisfactory pavement was constructed in the course of time.

No startling development occurred in the shell business until the Lone Star Cement Company built at Houston in 1917 the first cement plant in the world to use oyster shell as a basic ingredient. Trinity Portland located in Houston in 1927, and Gulf Portland in 1935, each creating an additional and more-or-less stable demand for reef shell.

The wide demand for improved pavements which paralleled the growth of the automobile industry in the twenties was quickly reflected in an increased demand for oyster shell as a base material in streets, driveways and parking areas.

If the industry had continued marketing the non-specification, unwashed, unscreened, unhallowed material just as it was found in Galveston Bay, it seems altogether probable that the shell business would have remained indefinitely in the bush leagues.

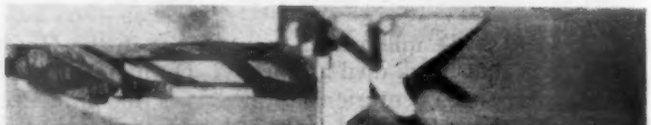
It was in 1928 that W. R. (Captain Bill) Parker, president and general manager of Parker Brothers Company, Inc., and the late W. G. Holbrook designed and installed improved dredge screens which made it possible for the first time to produce oyster shell to specification. Since that time their company has become the leading producer in the shell industry, and oyster shell has gained recognition as one of the top-drawer raw materials in the rapidly expanding Houston-Galveston industrial area.

Two hydraulic dredges, the *Trinity* and the *Colorado*, and a fleet of 7 Diesel tugs and 53 barges are operated by Parker Brothers Company, Inc., for the recovery of oyster shell from reefs in Galveston Bay and along the Texas Gulf Coast. The best reefs are believed to have been in the process of formation for thousands of years. The more extensive formations are many miles in length, and many vary in width from a few feet to 2 or 3 miles; they are found most frequently in 4 to 6 feet of water, and an average reef may be worked down to a depth of from 4 to 12 feet before the volume of mud becomes too great for further economical operations. Many of the reefs encountered have little or no commercial value, and to protect themselves from losses the companies engaged in shell recovery now carry on extensive prospecting and sounding work well in advance of their dredging operations. The reefs are carefully staked and accurate charts are maintained, showing the progress of work in much the same detail as is considered desirable in comparable dry land excavations.

The Diesel-powered dredges use their spuds for practically all the maneuvers they are required to execute on the reefs; they shift almost constantly back and forth across the reefs as the 48-inch diameter closed cutters bite into the material at the rate of more than 600 cubic yards per hour. On the *Trinity* the 1-to-8 mixture of shell and water is pumped to the screens by a 15-inch Morris dredge pump. The power plant consists of a 675-horsepower Cooper-Bessemer 8-cylinder solid-injection-type Diesel engine which drives the cutter, pumps and other primary equipment through V belts and gearing. A 75-horsepower Diesel engine of the same make is direct-connected to a Westinghouse direct-current marine generator to furnish power for the lighting circuits.

The dredge pump discharges the mixture of shell, silt, mud and water directly into the tandem 10-feet wide by 24-foot long triple-deck screen which is mounted about amidships and which towers above even the spud frame. Rows of spray nozzles located at frequent intervals above each deck of the screen direct a flood of water at such an angle that the shell fragments are pro-

View of the cutter and the 50-foot ladder out of water, aboard dredge "Trinity."



A long inclined belt-conveyor discharges the material into batching bins.

Shells are unloaded from the barges into the company's dock by a dragline.

pelled downward as silt and mud are washed through the screen panels. The fine materials drop into a tank under the screens and are permitted to flow overboard. Normally the top screen has 1½-inch openings, the middle ½-inch and the bottom ¼-inch. Manually-operated doors at the bottom of the screen make it possible to divide the flow between the port and starboard discharge spouts so that 2 barges may be loaded simultaneously. Similar doors also make it possible to load different sizes of shell when 2 barges are available, since for obvious reasons only one grade of material can be loaded on any one barge.

Captain E. E. Anderson at the controls in the lever room of the dredge "Trinity."

Enclosed steel troughs, sloping downward, carry the washed and graded shell to points about 10 feet to port and starboard of the dredge hull, where the direction of flow may be varied through a full circle by means of a swivel chute which is controlled by cable from the dredge. This arrangement makes it possible to trim the barges accurately with the minimum of shifting. A shift boat is generally available for moving barges on the reef. The barges range in capacity from 400 to 1,000 cubic yards, and a majority are of steel construction.

The belt conveyor which feeds shell to the Shellbuilder Company plant.

The dredges operate on a 24-hour day basis and never leave the reefs except for major repair work or when the dreaded hurricane warnings send all craft scurrying for shelter. A captain and a crew of men per shift are required to operate each dredge, and each man remains on duty for 15 consecutive days, followed by a 3-day shore leave. Suitable quarters and excellent food are provided on the dredges.

For the past several years the *Trinity* and the *Colorado* have worked on shell reefs situated approximately 15 miles northeast of Galveston. Depending to some extent on wind direction, tide and other factors, the round trip from the reefs to the company's dock in Houston takes from 18 to 24 hours with three barges in tow. The round trip to Galveston takes only 6 hours and is usually made with only one barge in tow. The main office can communicate with the dredges by means of short-wave radio. A small launch runs out to the reefs each day from the company's Kemah plant, carrying supplies and relief crews.

View of the screens, showing sprays that wash shell through the upper deck.

For the last 5 years 65 per cent. of the Parker Brothers Company's total production has gone to industrial firms. The largest consumer during this period has been the Dow Magnesium Corporation's plant at Freeport, Texas, where the raw shell is burned in rotary kilns to produce lime, which is used in the production of magnesium. Under normal condi-

Dust collectors at the Shellbuilder plant recover about 4,000 pounds of fine shell dust daily.

Shellbuilder's pulverizer, which reduces the material to chicken-feed size.

tions the local cement companies are large consumers of oyster shell. The Trinity Portland Cement Company, for example, in an average normal year purchases about 200,000 tons of shell in which the silica content is guaranteed to be less than 1 per cent. Sizing of the shell is not essential in the manufacture of cement, although it is of the utmost importance in other industrial applications. Practically all commercial consumers of shell buy the material on the basis of barges delivered to their own docks for unloading by their own men and facilities.

In Houston the Parker firm operates several yards and plants at which not only shell but sand and gravel are stored and shipped. At the Engle Street yard, located on the Houston Ship Channel, shell for use in the company's own operations is unloaded from barges into stock piles above a 500-foot-long concrete reclaiming tunnel. A Link-Belt Diesel-powered dragline is used principally for this unloading operation. Reclaiming belt-conveyors located in the tunnel feed the shell at the rate of about 200 tons per hour to long, inclined belt-conveyors which discharge into the various batching bins.

In 1932 the Parker Brothers company started producing under patents owned by W. G. Holbrook & W. R. Parker an asphalt-coated-shell wearing surface that required not more than 20 gallons of asphalt per ton. This low-cost and quite versatile paving material met with almost immediate success and ever since its introduction, one of the company's most frequently recurring problems has been to expand its batching and mixing plants rapidly enough to keep pace with the demand.[1] A 60-ton-per-hour Butler bituminizing plant installed in 1939 kept pace with the demand for several years, but last year an additional plant was erected to triple the company's capacity.

These plants are both designed so that they may be used when necessary to produce a cement-stabilized shell road-base material containing about 8 per cent. by weight of Portland cement. One of the most interesting and useful characteristics of oyster-shell aggregate is that when used in concrete it develops a relatively high tensile strength which makes it possible to pour large areas without expansion joints. As a result both subgrades and wearing surfaces made with this material stand up exceptionally well under traffic for long periods of time. As might be expected, shell-aggregate road surfaces have excellent non-skid properties.

On a lot adjoining the Engle Street plant in Houston the Shellbuilder Company dries, grinds, pulverizes and screens oyster shell to produce chicken grits, cattle feed, fertilizers and cement paint and asphalt fillers. A special belt-conveyor feeds the shell from the reclaiming tunnel directly into a 6-foot diameter by 70-foot gas-fired rotary drier in the Shellbuilder plant. The moisture content of the shell is reduced to about 0.025 per cent. by the 250-degree F. temperature of the drier in order to permit accurate screening of the various sizes.

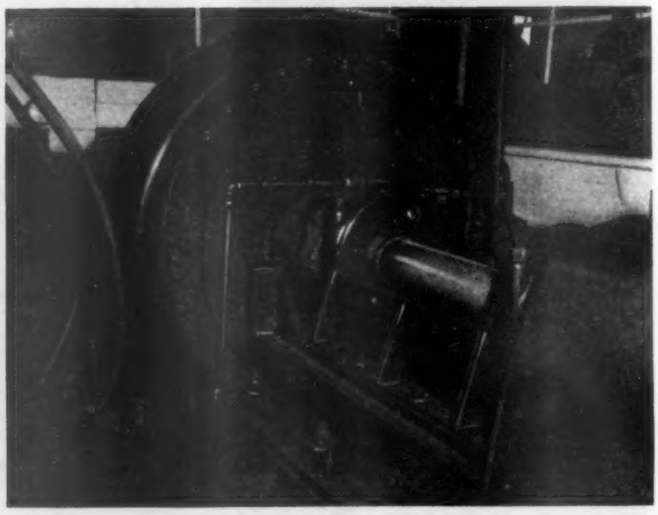
A Williams No. 3 hammermill and 2 Sprout-Waldron attrition mills operating in closed circuit with Tyler Hummer 3-deck vibrating screens and a Sturtevant air separator, enables this plant to produce 14 tons per hour of chicken feed shell in 3 sizes, and 7 tons per hour of the finely pulverized material which is sold primarily as feed. About 4,000 pounds of extremely fine, pulverized shell is recovered daily by means of 2 W. W. Sly dust collectors which are connected to the totally-enclosed screens throughout the plant. This

The 6,000-pound mixer for asphalt topping, which contains 1/8-inch to 5/8-inch shell.

(*Continued on page* 70)

1. [See: *Ready-Mixed-Concrete Plant Is Busiest Part of Texas Firm;* PIT AND QUARRY, December, 1944, page 103.—ED.]

Diesel engine on the dredge "Trinity."



The "Trinity's" dredge pump.

THE SCIENTIFIC METHOD OF MEASURING VIBRATIONS FROM QUARRY BLASTING

By JULES E. JENKINS
Head of Vibration Measurement Engineers

another P&Q exclusive

THERE is every indication that the post-war era will be one of the most prosperous periods in the history of the United States. The pent-up demand for sand, gravel, crushed stone, cement and other building materials, to be used in the construction of homes, highways, public works and countless other projects, will call for peak production on the part of the nonmetallic mining industry. Peak production means increased blasting schedules. Increased blasting schedules mean more blasting complaints. More blasting complaints carry with them potential investigation and legal expenses, adverse municipal regulations and many other unforeseen contingencies.

All of which suggests the question: Do your post-war plans include a long-range viewpoint on this important phase of your future blasting operations? Does your post-war budget include an appropriation for seismic exploration which will provide you with the fundamental information you require in order to enable you to deal with this important problem intelligently?

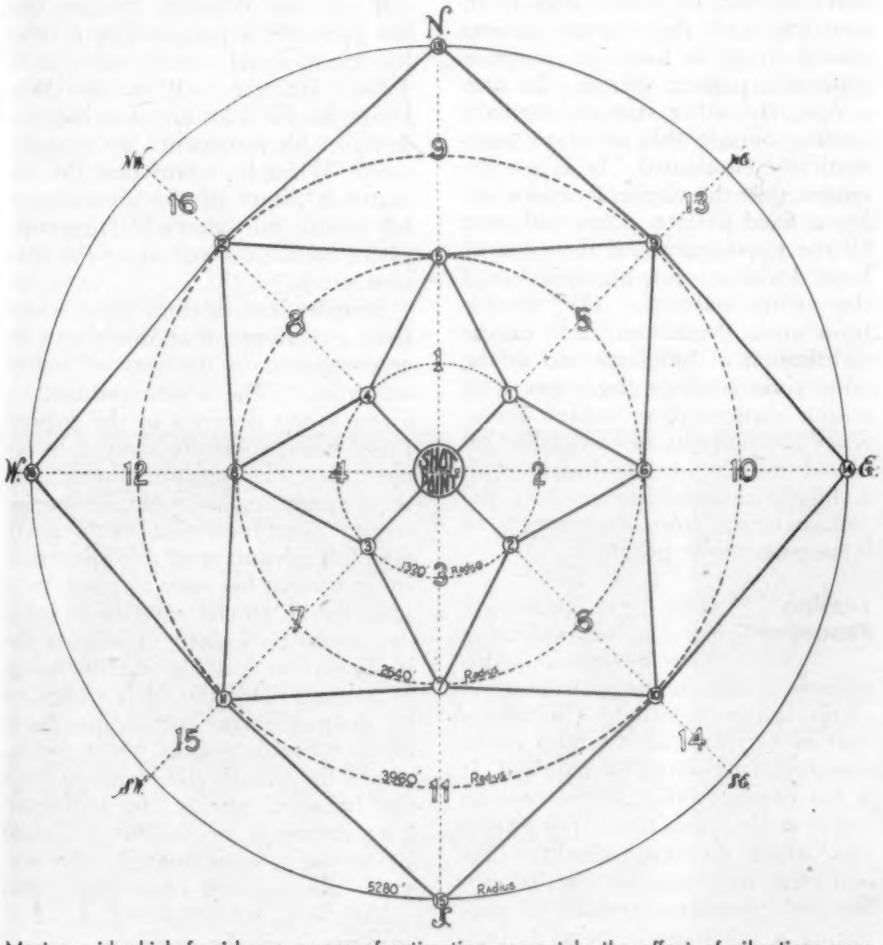
Factor in Production Costs The past decade has witnessed a steady rise in blasting complaint levels in all sections of the country. Costs incidental to the investigation of these claims and legal expenses incurred in the defense of lawsuits constitute hidden production costs which can not be disregarded with impunity. Add to this the curtailment of practical and productive blasting schedules in order to comply with some inane municipal ordinance, and the end-result is often a substantial amount.

As a group, the users of commercial explosives are themselves responsible for this rise in the complaint level, litigation, and adverse regulatory legislation. On the whole, mining operators are prone to wait until their particular complaint problem becomes acute before they get around to instituting proper investigation methods. In the meantime, John Public gets in his dirty work.

Fear Breeds Regulation John doesn't know anything about blasting except that it uses dynamite and that dynamite is dangerous. Didn't he listen to that radio story which told about the fellow who carried one stick of it around and eventually blew the whole town to Kingdom Come? "That's why my place is full of plaster cracks," thinks he. "They are using too much dynamite." His imagination begins to work overtime. He finds his neighbors eager listeners. They become able assistants. Soon the town is talking. Each tale increases with the telling, and the community becomes fraught with rumor. Demand is made upon public officials to stop this wanton destruction forthwith.

Public officials, generally sharing the lay viewpoint, act to rectify this "grievous wrong". An ordinance is proposed. It contains provisions for drastic reductions in dynamite charges or other ill-advised regulations. Putting these regulations into effect seriously curtails production schedules and sharply increases mining costs. Wagging tongues have built up a mighty threat to practical and economical operation. The inroad made by insidious gossip is manifest.

Scientific Blasting Not Dangerous Confronted with these facts, the quarry operator now begins to realize that his precarious position is the result of his own laxity. He recalls having read somewhere that scientific investigations have demonstrated that blasting done in accordance with accepted practice is not harmful to nearby properties. He digs up the information. Let's look in on Mr. Average Operator while he again



Master grid which furnishes a means of estimating accurately the effect of vibrations upon points within a radius of a mile from the shot point.

reviews the scientific information he filed away many months ago for future reference.

On second reading, our operator now discovers that all this "technical stuff" seems to fit his current complaint problem perfectly. For the first time he notes that science has made one important reservation with respect to the blanket application of its findings. Now it is clear to him that this reservation in effect states that science is prepared to show that the residual effects of blast-produced vibrations, transmitted through the earth, are of microscopic magnitude. However, to be of specific value, these findings must be related to local terrain and blasting practices. The operator must fortify himself with a reasonable amount of data which will show that the blasts he puts off and the stratification of the immediate territory are akin to those from which the scientific findings are derived. Oh, yes, he had intended to do that, but the problem was not pressing then, and the expenditure did not appear to be justified. So the expert is hired. He commences his work in the teeth of public disbelief. His explorations must be concluded in haste. Haste requires extraordinary methods, and these cost money. The work could have been done more efficiently and at less expense, if Mr. Average Operator had heeded the recommendations of science and put into effect proper methods at the outset.

Seismic Surveying With the post-war era at hand, the time is ripe for the nonmetallic-mining industry to undertake the next major step in presenting the facts to the public. Since 1930, science has investigated every phase of commercial blasting and its vibratory aftermath. The end-product of their labors has provided a "yardstick" by which the vibrations can be evaluated with accuracy. The public has little knowledge of these findings. Before they can be presented to the residents of his community, Mr. Average Operator must be prepared to prove that the facts regarding his operations compare favorably with the mass of data that science has developed for his benefit.

Just how can this be accomplished? The answer is provided by the seismic survey, which is predicated upon the master grid system of investigation. This is how it operates: The blast area is resolved into a common shot point. This point is encircled by a series of concentric circles spaced at quarter-mile intervals extended to an over-all distance of 1 mile. (See diagram on preceding page.) Under certain conditions this distance may be extended to 1¼ miles. Radials are projected from the shot point to eight cardinal compass points. Seismic control stations are established at every other point of intersection between the concentric circles and radial lines and alternately staggered at each radius. To provide flexibility, this stationing may be rotated one segment counter-clockwise so as to accommodate local geography. This provides a total of 16 zones, 12 of which are "enclosed" by 4 points of measurement. The farthest outlying zones are screened off by a string of three seismic stations.

Each grid is tailored to the individual needs of the quarry under investigation. Thus, if it is found that the territory adjoining the shot point does not lend itself to the overall coverage provided, so that, for example, the station positions come in open land, rivers or other non-effective points, such points are merely eliminated. Or, if complaints should be within a certain area, as when a townsite lies within the southeasterly quadrant, several of the radial lines may be "swept-up" and concentrated within such quarter-circle and the seismic stations placed so as to form an adequate geometric pattern therein. In such a case, the other stations normally coming outside this area are automatically eliminated. It is not intended that the station locations follow a fixed pattern. They will meet all the requirements, if they can be located within a few hundred feet of the point selected. The flexible framework overcomes any erratic distribution of buildings and at the same time confines the network of seismic stations to systematic limits. Since the majority of complaints received usually involve buildings, it is highly desirable to conduct the measurements from the interior of homes whenever possible.

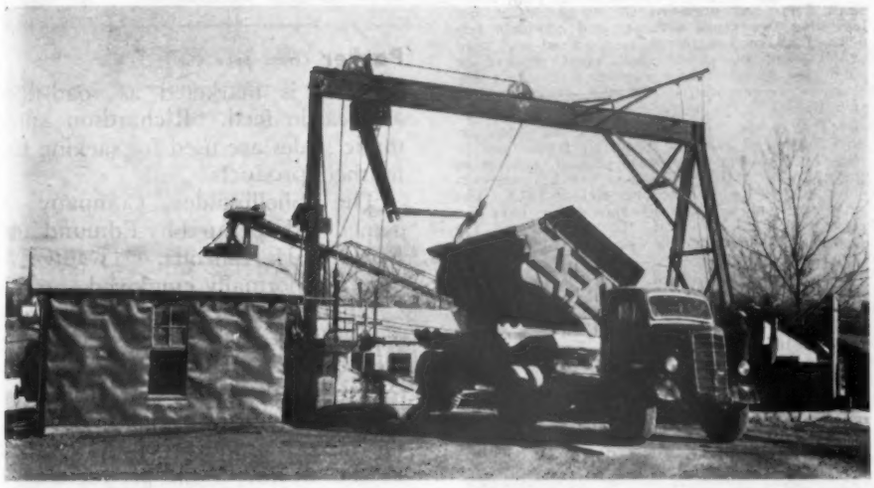
Testing Procedure The test procedure consists of making a three-dimentional displacement measurement from each of the stations selected. This means that in extreme cases a total of 16 measurements would be required. It is not necessary that all the tests be made at the same time. For operators whose blasting schedules are scattered or irregular, the recommended procedure consists of preparing a few blast holes at a time. It can then be arranged that these holes be fired and measured on a predetermined date, thus, if given four shots at a time, the entire survey can be completed in four days of field work, spread out over an indefinite period. In general, extending the field work over a prolonged period does not increase its cost, since the travel expense of the investigators for several visits to the plant does not vary greatly from the expenses involved in their remaining for the full number of measured blasts.

Use of Seismic Data In final form, the data developed by these tests are shown by contour maps. Thus, when John Public rushes in with his claims of damage, Mr. Average Operator can calmly refer to his seismic survey and with confidence explain that John's home, which happens to lie in Zone 9, is being shaken by vibrations the magnitude of which is about equal to the thickness of a sheet of writing paper. He can show John how his place was encircled by 4 points which have been tested, none of which give any evidence to support John's claim. Once educated, John is a reasonable man. At first he will cling stubbornly to the ideas he himself created. When he realizes that the operator is prepared to combat his exaggerated claims with facts, John's interest will wane. Who knows better than he, that the majority of his statements are exaggerated? When he learns that the operator is aware of the absurdity of his claims, the latter's blasting-complaint problem is well along the road to solution.

Seismic investigators have found from experience that much can be accomplished in the way of public education if the widest publicity is given to the progress of the survey. Local newspapers are anxious to cooperate. The measurements and their results create wide reader interest. The progressive operator will take full advantage of this opportunity to present his story to many people. Public officials and civic leaders should be invited to witness the loading procedure and the discharge of a blast. This should be followed by their observing the measurement of its vibratory effect. If possible, one of the tests should be made from the home of one of the witnesses. City engineers or architects should be invited to participate in the survey. They should make their own calculations with respect to shot loadings and the tonnage moved.

(*Continued on page* 70)

Quarry That Went Underground Solves Production, Haulage, Power Problems



Dumping mechanism and one of the late model trailers at the Stewart Sand & Material Company, Pixley, Missouri.

another ON THE SPOT report

AN interesting example of the transition from open quarrying to underground mining which is confronting a growing number of quarry operators is provided by the operations of the Stewart Sand & Material Company at Pixley, near Independence, Missouri. This deposit had been operated for 15 years as an open quarry until 1928, when the overburden became so heavy that the development of a mine was begun. This change was also made to obtain higher-grade stone. Locomotives and cars were used for hauling the stone with a few trucks to help out. In 1930 when the present owners took over, the operations were converted entirely to truck haulage. At first only two Mack AC 7½-ton trucks were used but two more were added in 1932.

The next major step in improving the haulage methods was taken in May, 1942, with the purchase of two Easton TR-10H trailers drawn by Mack EG gasoline tractors. These trailers are of the side-dump type with a capacity of 14 tons and were originally equipped with telescoping hydraulic hoists. When two new Easton TR-10H trailers with Mack tractors were added recently, these hoists were removed. The four bodies are now dumped by an Easton elbow-dumping mechanism operated by a Curtis air hoist for which air is provided by a 160-cubic-foot-per-minute Gardner-Denver compressor.

During the 1942 war-building boom the two original truck-trailers and several of the trucks were used on two 10-hour shifts daily to keep the plant supplied with its capacity of 180 tons per hour. This demand so far exceeded the local producing

By W. E. TRAUFFER

capacity that crushed stone was on priority for a time.

The mine is in a ledge of Bethany Falls limestone which meets all specifications. The room-and-pillar method is used with 30-foot-diameter round pillars and 38- to 45-foot rooms. The rooms average 17 feet in height and from 4 to 5 feet of stone is left for a roof. Over this are beds of slate and shale and then a 25-foot ledge of Winterset limestone which is no longer acceptable in this area.

The drilling is done with jackhammers, and du Pont C&H ammonia dynamite is used. Caps and fuses are used and the latter are trimmed after loading to shoot in the proper rotation. Double rounds are seldom shot, as single rounds result in fewer missed holes.

The stone is loaded into the trailers by two Marion Model 450 and two Bucyrus-Erie 20B electric shovels. Two have ¾-cubic-yard and two have 1-cubic-yard dippers. The workings are now ½ mile inside the mine opening, which is 600 feet from the plant hopper. The roads in the mine and outside are kept in shape by a Caterpillar R4 tractor

Blacksmith shop in the mine, with drill sharpener at left.

One of the trailers being loaded in the mine.

One of the two original trailers with telescoping hoist which has since been removed.

with a Le Tourneau bulldozer. This is also used to pile up rock for shovels.

When they can be obtained, the company plans to buy two more trailers. These are preferred to trucks in spite of occasional spots where they must be backed in for loading. Their advantages are cited by officials of the company as greater load capacity, easier dumping, more even tire wear, and less wear.

Other problems also had to be overcome in the transition to mine operation. The two 650-cubic-foot-per-minute, 2-stage main compressors used in the quarry were originally located at the mine entrance with a supplemental compressor inside, but the 2,000-foot line to the working face, by 1938, caused too high friction and leakage loss. In that year both compressors were moved inside the mine. One of them is of Worthington and the other of Sullivan manufacture. The supplemental compressor is a 350-cubic-foot-per-minute Gardner-Denver.

Originally the 440-volt sub-station at the plant also served the mine, but as operations progressed the loss of voltage became too great—as low as 320 volts in the mine—and the motors overheated. Raising to 480 volts at the sub-station did not help materially; so in 1942 an additional 440-volt mine sub-station was installed on the surface over the mine. The 440-volt power line enters the mine through a well-drill hole drilled 55 feet from the surface through the mine roof. Now there is only a negligible voltage loss, the motors run cool, and the shovels and compressors can be operated at their rated capacities. Lines from this sub-station feed current to the shovel motors, to the 275-horsepower motors driving the three compressors and to the 5- and 10-horsepower mine pump motors—a total of nearly 550 horsepower. A blacksmith shop, equipped with an Ingersoll-Rand drill sharpener, and a forge are also located in the mine.

Victory (from page 62)

cific authorization of the War Production Board except after filing Form WPB-1319, or any prescribed special application form in the manner above provided, or except after filing a project application.

Miscellaneous Provisions

(k) *Records and orders.* Each producer and each distributor acquiring maintenance, repair, or operating supplies pursuant to this order shall keep and preserve for a period of not less than two years accurate and complete records of all such materials so acquired and used or disposed of which shall upon request be submitted to audit and inspection by duly authorized representatives of the War Production Board.

(l) *Reports.* Producers shall file such report forms as may be required from time to time by the War Production Board, subject to the approval of the Bureau of the Budget, pursuant to the Federal Reports Act of 1942. The reporting requirements of this order have received the approval of the Bureau of the Budget pursuant to the Federal Reports Act of 1942.

(m) *Additional assistance and appeals in individual cases.* If the sound working condition of a producer is adversely affected by any provisions of this order or by inability to obtain material essential for repair, maintenance, or operating supplies, the producer may apply to the War Production Board for additional assistance by letter, in duplicate giving the reasons why such assistance is essential. If an increased quota is sought, the present quota should be stated. In case of breakdown, imminent breakdown, or other emergency, the application may be made by telegraph or telephone either to the Mining Division, Washington, D. C., or to the nearest regional or district WPB office.

(n) *Communications.* All reports and applications hereinunder and all other communications with respect to this order shall, except as otherwise specifically provided, be addressed to the Mining Division, War Production Board, Washington 25, D. C., Ref: P-56.

(o) *Violations.* Any person who wilfully violates any provision of this order, or who, in connection with this order, wilfully conceals a material fact or furnishes false information to any department or agency of the United States is guilty of a crime, and upon conviction may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using, material under priority control and may be deprived of priorities assistance.

Issued this 30th day of June 1945.

WAR PRODUCTION BOARD,
By J. JOSEPH WHELAN,
Recording Secretary.

INTERPRETATION 1
APPLICABILITY TO CUTTING AND POLISHING OPERATIONS AT THE QUARRY

The term "producer" as defined in Preference Rating Order P-56 includes persons operating a quarry and also persons conducting further cutting and polishing operations at the quarry site, such as the manufacture of building stone and tombstones. These latter operations are included in the phrase "preparation for shipment, of the products of mining activity" appearing in paragraph (b) (1) (j) (§ 3201.11) of the order.

Since paragraph (j) (1) of the order forbids "producers" from obtaining any materials under CMP Regulation 5, producers of tombstones or other stone products at the quarry site may not operate under the regulation but must get priorities assistance exclusively under Order P-56.

The manufacture of tombstones and structural stone at a separate plant away from the quarry is not covered by Order P-56, and priorities assistance for MRO supplies required in such operations may be obtained under CMP Regulation 5. Under CMP Regulation 5, a rating of AA-2 is assigned to persons engaged in the manufacture of structural stone, while persons engaged in the manufacture of tombstones and monuments may use the AA-5 rating which is assigned under that regulation to unlisted business.

(Issued Nov. 13, 1943.)

TRACK-LAYING TRACTORS. — The smallest types of track-laying tractors are no longer subject to the distribution controls of the construction machinery order, L-192, the War Production Board said July 13. Track-laying tractors (22-drawbar horsepower and over) are the types now appearing on List 2 of the order, together with cranes, draglines and shovels of designated types. The change in coverage was made by amendment to Order L-192, issued July 13. Items on List 2 may be sold only on specific W.P.B. authorization for which application is made on Form W.P.B 1319. Such authorization need no longer be obtained to sell the Class V special size track-laying tractors (having a drawbar rating of less than 22 horsepower).

All the other provisions of L-192 (reprinted in full in PIT AND QUARRY, July, 1945) remain unchanged.

Parker (from page 66)

material is marketed as road-filler and cattle feed. Richardson automatic scales are used for sacking the finished products.

The Shellbuilder Company is owned and operated by Edmund and Fernand H. Pincoffs. Twenty-five men are normally employed.

When the Parker Brothers Company, Inc., was organized in 1925, there were 4 employees on the payrol; today there are more than 400 employees and the company is easily the largest producer of oyster shell in the world. With production of this company alone averaging approximately 2,500,000 cubic yards annually, fear is felt in some quarters that the oyster shell reefs are being depleted too rapidly. But the five Parker Brothers—Captain Bill, general manager; Captain Charlie, in charge of maritime equipment; Captain Briscoe, in charge of production, Captain George, in charge of sales and distribution; and Captain Bob, treasurer of the corporation—have little patience with this point of view. They are still thinking in terms of new opportunities and new markets and still other new industries in the Houston-Galveston area.

Vibrations (from page 68)

They should be consulted in connection with the selection of measurement stations. There are innumerable occasions on record where this procedure has been followed and the local operator thenceforth experienced a sharp reduction in, or the complete elimination of, his blasting troubles.

At Red Bluff, California, a $30,000 washed rock, sand and gravel plant has been opened by Archie Draper and Floyd Adams. Estimates placed the capacity of the 13-acre tract at 800 tons a day for several years.

Walter Hines, successor to the Westergard Sand & Gravel Company near Maunie, Illinois, has begun operation of his gravel plant, the Walter Hines Sand & Gravel Company.

Theory and Practice of Rotary Kiln Operation in the Manufacture Of Portland Cement

By "PORTLAND"

Part I

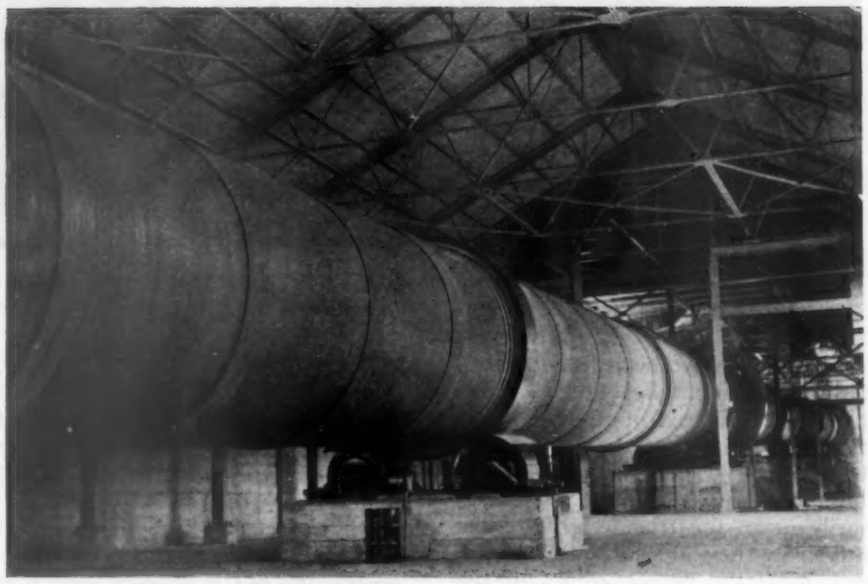
PORTLAND cement was developed in England about 1824. The materials used in its manufacture are usually limestone or chalk and clay or shale. While these materials are very common in nature, the product resulting from their combination is rather complicated.

All physical material with which we have to deal is made up of compounds and mixtures of simple basic matter called elements. An element is the simplest form of matter. There are on this earth about 96 known elements. It is with certain of these elements that the chemist has to deal in controlling the manufacture of cement. These elements are designated in chemical expressions by letters or symbols, some of the more common of which are: O for oxygen, H for hydrogen, C for carbon, Fe for iron, and Ca for calcium.

Compounds, Mixtures and Solutions The smallest division or quantity of any element is called an atom. More advanced knowledge has shown us that atoms can be divided into electrons, but this need not concern us in our present discussion. These atoms of different elements join together in certain ratios or numbers to form molecules. This is called chemical combination, and the resulting new substance is called a *compound*. A compound may have characteristics entirely different from those of any of the elements which entered into its make-up.

Sometimes different elements and also compounds mix together but do not enter into chemical combination, and these are called *mixtures*. Concrete is a mixture. A quantity of salt and sugar might be stirred together to make a mixture, but, considered separately, both the salt and the sugar are compounds.

Either salt or sugar will dissolve in water and, if the quantity added to the water is not too great, both these compounds will remain dissolved, and will not settle out as would fine mud or sand. This is called a *solution*. A solution is not always a liquid, but is sometimes a solid.



One of the giant kilns in a Canadian plant. Dimensions: 11 feet 5 inches by 10 feet 2 inches; length, 455 feet.

Broadly speaking, there are, then, three different forms in which we have to consider material, namely *compounds, mixtures* and *solutions*. We also have to deal with these in a liquid, gaseous or solid state. That is, a certain compound may be in the form of a gas, liquid or solid. Water is a compound which may also exist as steam or ice.

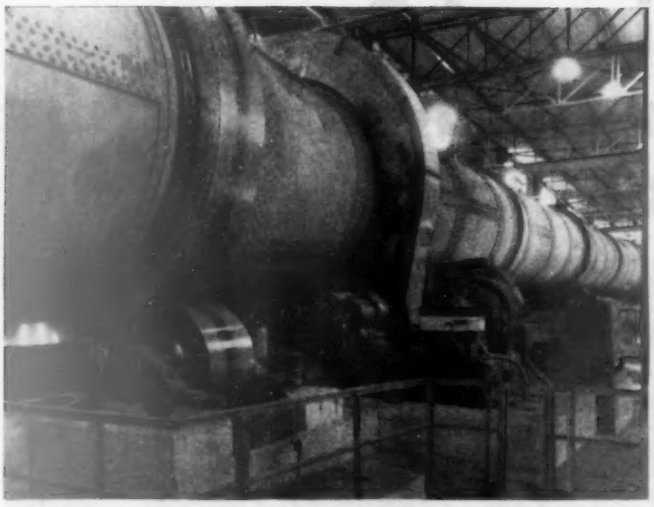
THIS article is the first of a series which will discuss the theory and practice of rotary-kiln operation as applied to the manufacture of Portland cement. The groundwork is laid in the current installment with an elementary discussion of such fundamental considerations as chemical combinations, latent and specific heat, kiln fuels, and calculations of heat and heat losses. All terms and units are carefully defined in order that the more advanced discussion may be readily understood by the average man in the mill.

The author, who is general superintendent of a company which operates a number of cement plants, has elected to write under a pseudonym, and his opinions are, of course, his own.—Directing Editor.

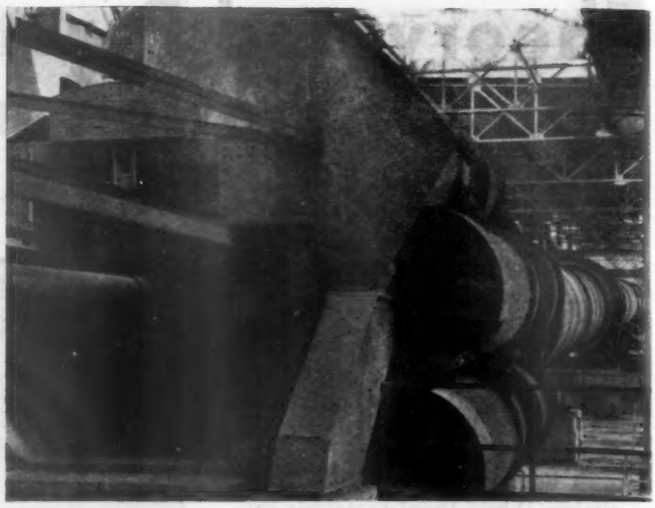
Chemical Combinations Some of the more common compounds are water (H_2O), carbon dioxide (CO_2), limestone ($CA\ CO_3$), etc. The figure adjoining the symbol indicates the number of atoms of the particular element in the molecule of the compound. Thus, the symbol H_2O indicates that two atoms of hydrogen have chemically combined with one atom of oxygen to form one molecule of water.

Very few of the elements exist in a pure state in nature and are often combined with oxygen to form oxides. Thus one atom of sulphur (S), plus two atoms of oxygen (O_2) combine to make one molecule of sulphur dioxide which is represented by the symbol SO_2. In a like manner CO_2 represents carbon dioxide.

Later on we shall discuss combustion, the liberation of heat and carbon dioxide, etc. So, to have a clear understanding of this phase of the subject, it will be necessary to consider atomic weights in connection with chemical combinations. Any element has a certain atomic weight, which is referred to the weight of oxygen, and the atomic weight of oxygen has been arbitrarily chosen as 16. Thus, an atom of sulphur, which has an atomic weight of 32, is twice as heavy as an atom of oxygen. The atomic weights of most of



Close-up view o fa rotary kiln, showing supporting roller, thrust roller and kiln drive. Note also the auxiliary gasoline engine (right).



Another view of a kiln now in use at a modern cement plant, showing multicylinder type of cooler.

the elements have been calculated or found experimentally. These weights may be considered more as numbers that simply indicate the relationship between the weight of atoms of different elements, and do not necessarily mean the true weights of the atom. By their use, however, we can determine the actual weight of the various constituents of a compound. As an example, let us consider 100 pounds of the gas CO_2. The atomic weight of C, or carbon, is 12 and that of O, or oxygen, is 16. Therefore, in a molecule of CO_2 the relative weights of the two elements, carbon and oxygen are 12 and 32. The 100 pounds of CO_2 will, therefore, contain carbon and oxygen in the proportion of 12 to 32.

Weight of Carbon=

$$\frac{100 \times 12}{12 + 32} = 27.27 \text{ pounds} +$$

Weight of oxygen =

$$\frac{100 \times 32}{12 + 32} = 72.72 \text{ pounds} +$$

100.00 pounds

Heat Another factor which we must consider in relation to chemical combinations or reactions is heat. It is a fundamental fact that when elements enter into chemical combination a definite amount of heat is either absorbed or liberated. If heat is liberated, the reaction is said to be *exothermic* and if heat is absorbed the reaction is called *endothermic*. This heat, whether absorbed or liberated, is called the heat of reaction. If a compound requires a certain amount of heat when being formed, this same amount of heat will be given up when the compound is broken up into its elements.

According to the modern theory, heat is molecular and atomic motion. In any gas the molecules are in a state of actual motion but in a solid they are said to vibrate. Heat is the physical manifestation or evidence of this motion. In a solid, if the vibration is sufficiently intense, the solid disintegrates or melts and becomes a liquid. If the molecular vibration becomes still more intense, the liquid breaks up and becomes a vapor.

It can be stated, then, that heat is not a substance or something physical that can be transferred from one body to another, but is rather the state in which a body exists. No matter how hot or cold a body may become there is no change in weight, provided, of course, that the solid or its vapors are not allowed to escape. When all molecular and atomic motion ceases in a body, it is said to be at absolute zero. It is estimated that this condition exists at about minus 459 degrees F.

Now, while it is true that heat is not a substance that can be transferred from one body to another, it may be easier to think of it as such when we come to deal with combustion, etc.

Temperature, Heat and Latent Heat It is necessary to distinguish between temperature, heat, and latent heat. Temperature is a measure of the frequency or rate of vibration of the molecules or atoms in a body and does not indicate the amount of heat in a body. The amount of heat in a body depends on its mass or weight, the kind of material of which the body is composed and its temperature. Thus, a certain body weighing one pound at a given temperature will contain only half as much heat as a body weighing two pounds, composed of the same material and at the same temperature. The unit of quantity of heat most widely used is the British thermal unit, (B.t.u.), which is the amount of heat required to raise the temperature of 1 pound of water 1 degree F.

When the heat in most solids and liquids is increased, the temperature continues to rise until a point is reached at which the rise in temperature stops, and a physical change commences to take place in the body. During this change, heat is added without effecting any increase in temperature. This heat is called latent heat. As an illustration, consider the boiling of water. When heat is applied to water at atmospheric pressure the temperature continues to rise until 212 degrees F. is reached and then the temperature ceases to rise. As still more heat is applied the water turns into steam. This heat applied at 212 degrees F. until the water is vaporized is called the latent heat of evaporation and is not indicated by temperature. It amounts to about 970 B.t.u. per pound of water. It will be shown later how this affects wet-process kiln operation.

Specific Heat The specific heat of a substance is the ratio of the heat required to raise the temperature of a certain weight of the substance 1 degree F. to that required to raise the temperature of the same weight of water 1 degree. It follows from this definition that the specific heat of water must be 1.00, expressed without units since the value represents a simple ratio. The specific heat of almost every substance is known, so that we can calculate the

amount of heat in B. t. u. required to raise the temperature of any material a given amount, and, conversely, if we know the temperature and weight of a body we can calculate the amount of heat it contains. Heat may be transferred from one body to another by conduction, convection and radiation. By conduction is meant the transference of heat between bodies that are in contact or the movement of heat within a body itself. By convection is meant the transference of heat from one point to another by moving masses of matter, as by currents in gases. The theory of radiation has not been fully developed, but one of the best illustrations of it is the transference of heat from the sun to the earth.

Table I.—SPECIFIC HEAT OF GASES AND LIQUIDS AT CONSTANT PRESSURE

Air	.240
Oxygen	.216
Hydrogen	3.385
Nitrogen	.235
Carbon Monoxide	.235
Carbon Dioxide	.200
Water Vapor	.454
Water	1.000

Kiln Fuels Coal, oil and gas are the fuels used in kilns producing cement clinker, but bituminous coal alone is the fuel most generally used, and is the only one that will be considered in this article. A typical analysis of a dried bituminous coal sample that would be suitable for use in a rotary kiln is given in Table II.

Table II.—TYPICAL ANALYSIS OF SAMPLE DRIED BITUMINOUS COAL

	Per Cent.
Carbon	80.00
Hydrogen	5.00
Oxygen	4.25
Nitrogen	1.85
Sulphur	1.20
Ash	7.70
	100.00

This is called an ultimate analysis. It is usual, however, when analyzing coal to make only a proximate analysis to determine the percentages of water, volatile matter, fixed carbon, and ash.

Coal is relatively complicated in structure. Some of the carbon, hydrogen, oxygen, nitrogen, and sulphur exist in various stages of combination, and will combine still further on the application of heat, to form various combustible gases. This is classed as volatile matter and in bituminous coal it ranges from 20 to 35 per cent. by weight. It is the first constituent of coal to be liberated on heating. A certain percentage is required in coal for use in cement kilns for reasons that will be stated later. The carbon that remains after the volatile matter is driven off is called fixed carbon. The carbon percentage given in the ultimate analysis is the total carbon and includes any carbon in combination that may appear as volatile matter on the application of heat.

Combustion is the chemical combination of oxygen with certain elements of the fuel to form new compounds with the liberation of heat. Every combustible substance has what is called an ignition temperature. This is the temperature to which it must be raised before chemical combination with oxygen or combustion will take place. These combinations liberate definite amounts of heat, depending on the elements entering into the combinations. The principal combustible elements in coal are carbon and hydrogen. Any sulphur present is also combustible but is of minor importance from a heat standpoint. It is desirable to have the percentage of sulphur as low as possible in coal used in cement kilns, because some of the sulphur reacts with the raw material and affects the quality of the clinker. The chief noncombustible elements in coal are silica, alumina and iron. These form the ash.

Calculation of Heat When the percentage of combustible elements in a coal are known, the amount of heat measured in B.t.u. that a pound of the fuel will liberate can be calculated. Table III shows the amount of heat liberated by the combustion of one pound of the elements named and also indicates the products of combustion, or in other words to what the elements burn.

Air contains approximately 23 per cent. oxygen and 77 per cent. nitrogen by weight. It is a mixture as the oxygen and nitrogen are not chemically combined.

Let us now return to the coal analysis previously given (Table II) and calculate the gross B.t.u. per pound of coal.

Carbon
= .80 pounds × 14,650 = 11,720 B.t.u.
Hydrogen
= .05 pounds × 62,100 = 3,105 B.t.u.
14,825 B.t.u.

Use of the Bomb Calorimeter Owing to the difficulty of making an accurate ultimate analysis of coal it is usually customary in industrial work to determine the B.t.u. content by actually burning a sample of known weight in a small tightly closed metal container, called a bomb. This bomb is suspended in an insulated vessel holding a given weight of water. A chemical is mixed with the powdered coal sample to supply the oxygen for combustion. The mixture of powdered coal and the oxygen-liberated chemical is ignited by an electric spark. Combustion takes place in the bomb very rapidly and the heat generated is transferred to the water. Some chemical combinations are hastened by the addition of a small amount of another element that does not enter into the combination but has the power of starting the combination. When a substance is used for this purpose it is called a catalyst. The B. t. u. is determined by measuring the temperature rise of the known weight of water. Since the specific heat of water is known, the B.t.u. can then be easily calculated. Certain correction factors have to be applied to allow for loss of heat from the water by radiation, and to take care of other factors relating to the apparatus.

Table III.—COMBUSTION DATA IN TERMS OF POUNDS PER POUND OF ELEMENT BURNED.

Pound of Element	Products of Combustion (Weight) CO_2	CO	H_2O	SO_2	Nitrogen	Air and Oxygen Required Air	Oxygen	B.t.u. Liberated
Carbon	3.667	....	....	....	8.85	11.52	2.667	14,650
Carbon	....	2.333	....	....	4.43	5.76	1.333	4,340
Hydrogen	....	....	9.00	....	26.56	34.56	8.00	62,100
Sulphur	....	....	....	2.00	3.32	4.32	1.00	4,032

It will be noted in Table III that oxygen is the only element that combines with the elements in the fuel. This explains why air is needed for the burning of coal, as all the oxygen required comes from the air. There is a very small percentage of oxygen in the coal but this can be neglected.

Heat Losses It will be observed from Table II that when hydrogen is burned, the product of combustion is water, and that one pound of hydrogen produces 9

pounds of water. Since in the combustion of fuel, either under a boiler or in a cement kiln, the exit gases enter the chimney at temperatures well above 212 degrees F., it can be seen that each pound of water from the combustion of hydrogen will leave as steam and will carry off about 970 B.t.u. of heat. This is not recoverable. The amount of hydrogen in coal is comparatively small, but in oil, or gas fuel, which have a much higher percentage of hydrogen, this loss is more serious. It is customary in some cases when giving the calorific or heat value of a fuel to state the net and gross B.t.u. In giving the net value, the B.t.u. loss as represented by the latent heat of the steam in the exit gases is deducted. In the low hydrogen coal that we have just considered, the loss per pound of coal would be calculated as follows:

Since 5 per cent. hydrogen = .05 pounds per pound of coal, the weight of water or steam from combustion = $.05 \times 9 = 0.45$ pounds. B.t.u. represented as latent heat = $970 \times 0.45 = 436$. Net B.t.u. for coal under consideration = $14{,}825 - 436 = 14{,}389$.

Some oil fuels may have a hydrogen content of 12 per cent. or more, so that the loss with such fuels would be correspondingly higher. The carbon in a fuel has the ability to combine with oxygen completely or only partly. In the former case the resulting product is carbon dioxide, and in the latter the product is carbon monoxide. This is a very important fact in combustion calculations. The amount of heat liberated per pound of carbon when only CO is formed is 4,380 B.t.u. while, as previously stated, the heat liberated when CO_2 is formed is 14,389 B.t.u. It is evident, then, that a great loss is incurred when combustion is not complete and part of the carbon in the fuel is burned to carbon monoxide.

Air Required for Combustion Let us now give some consideration to the amount of air required for combustion. From the typical coal analysis, we find the total carbon to be 80 per cent. and the hydrogen 5 per cent. The air required per pound of coal can then be determined by using the atomic weights to which previous reference has been made.

$C + O_2 = CO_2 = 12 + (16 + 16) =$
12 C. + 32 O.

This means that 12 pounds of carbon will require 32 pounds of oxygen, therefore 0.8 pounds C will require:

$$\frac{0.8 \times 32}{12} = 2.13 \text{ pounds oxygen}$$

Also, $H_2 + O = H_2O = (1 + 1) + 16 = 2H, +16O$, or 2 pounds of hydrogen will require 16 pounds of oxygen. Therefore, 05 pounds H. will require $.05 \times 16 = 0.4$ pounds

$$\frac{}{2}$$

oxygen. Total weight of oxygen = $2.13 + 0.4 = 2.53$ pounds per pound of coal burned.

Since air is only 23 per cent. oxygen by weight, the amount of air required to supply 2.53 pounds of oxygen will equal $\frac{2.53 \times 100}{23} = 11$ pounds. This means that 11 pounds of air is required for the complete combustion of one pound of coal having a total carbon content of 80 per cent. and containing 5 per cent. hydrogen.

If less than this amount of air is supplied there will not be enough oxygen to combine with all the carbon and form CO_2, with the result that some CO will be formed, and, as previously shown, this will entail a considerable loss of heat units. Now since the combustion of fuels is not an instantaneous process and has to be accomplished under certain conditions of temperature, etc., all of which will be treated later, it is found that slightly more than the theoretical amount of air is usually required. This is called excess air. If this excess air becomes too great, a loss of heat will also result for the reason that heat units are required to raise the temperature of this excess air to the temperature of the gas that enters the stack, and are thus wasted.

Gas Analysis As a means of checking the efficiency of combustion, chemical analyses can be made of the exit gases from a kiln or furnace. Such analyses will show the per cent. by volume of carbon dioxide (CO_2), carbon monoxide (CO) and free oxygen (O_2). The presence of free oxygen in the exit gas would indicate excess air and carbon monoxide would indicate a deficiency of air. When the analyses of fuel is known the maximum per cent. of CO_2 that the exit gas will contain can be calculated. The CO_2 content of the exit gas can then be used as an index of the efficiency of combustion.

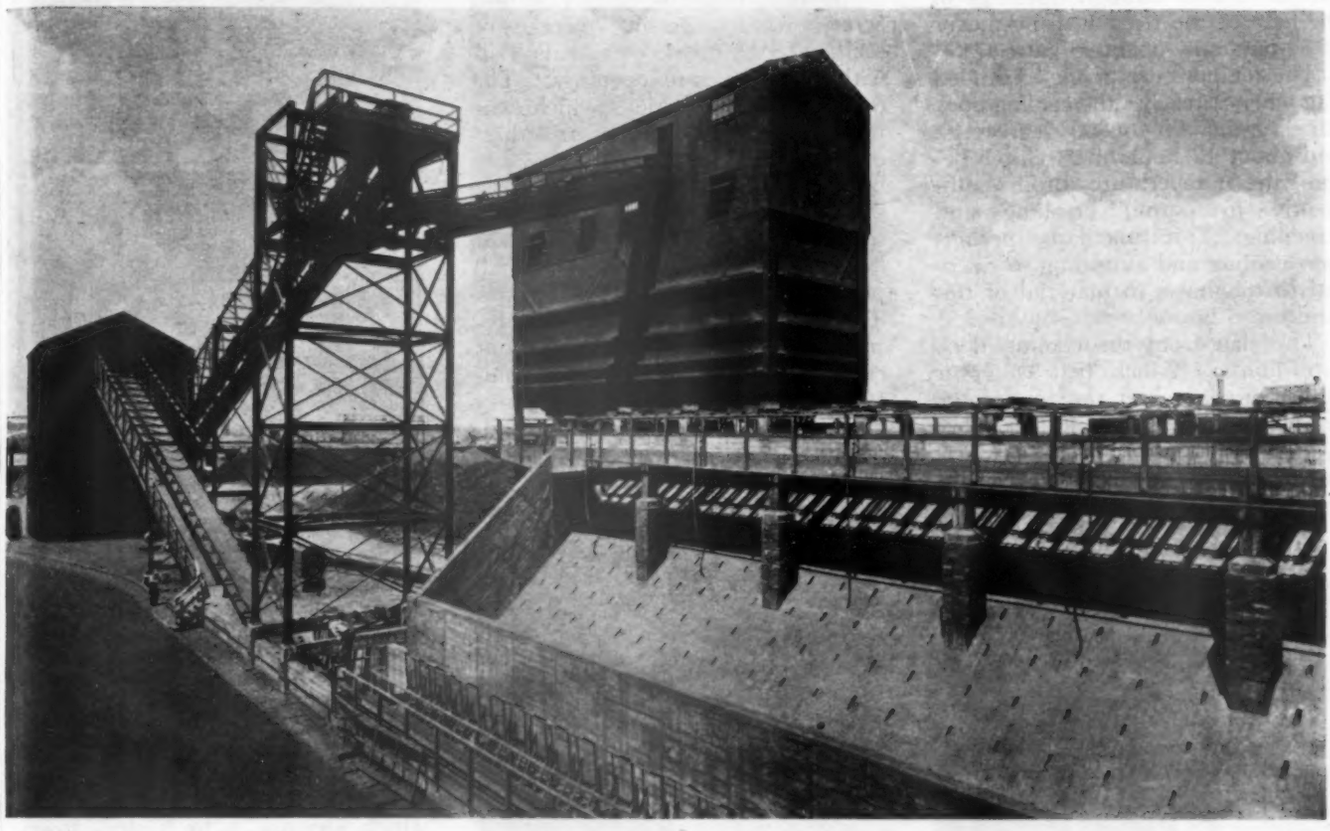
There are a number of devices in use for analyzing stack gases. One of the most commonly used devices works on the principle of taking a known volume of the gas mixture at a known temperature and exposing it to various chemicals in suitable containers. Each of the chemicals will absorb a certain kind of gas. If the reduction in volume of the gas sample under consideration is measured after each exposure, the per cent. of each kind of gas in the sample can be determined. There are other types that measure CO_2 and CO electrically. These types are very useful as they can be made to indicate and record continuously.

(To be continued.)

View in the analytical laboratory operated by one of the larger cement companies. The adiabatic calorimeter, used for determining the heating value of coal, and an electric carbon combustion furnace are visible in the background.

Bureau of Mines reports show that the quantities of blast-furnace slag consumed in the manufacture of mineral wool and light-weight aggregates have increased since 1942 and that the promotion of agricultural slag has been rather successful. Finely ground slag is said to be valuable as a liming material and as a source of essential minor fertilizer compounds.

Expanded Slag Plant at Republic Steel Producing Light-weight Aggregate



General view of the recently opened expanded slag plant for the manufacture of lightweight Celocrete aggregate, Republic Steel Corporation's works, South Chicago, Illinois. Here are shown the crusher house, conveyor system, delivery bin and cooling dock.

another ON THE SPOT report

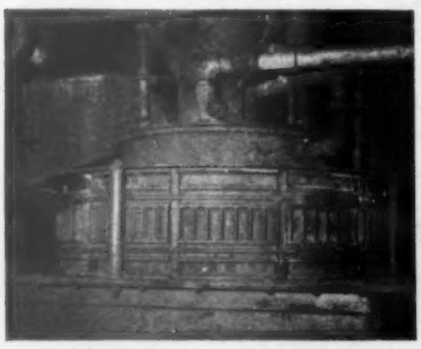
A COMPLETELY new and modern expanded slag plant, the largest of its kind in the United States, started production of light-weight Celocrete aggregate early in August. The government-owned plant was built by the Defense Plant Corporation for operation by Republic Steel as part of the extensive development of a 160-acre site extending along the east bank of the Calumet River in South Chicago, Illinois.

The completion of the new plant marks another important stage in the fulfillment of a program which was launched seven years ago when the Celotex Corporation began the merchandising of light-weight aggregate. The South Chicago unit brings the total number of Celocrete manufacturing plants to five; other plants are located at Cleveland, Buffalo, Pittsburgh and at Troy, New York. When conditions permit, additional plants will be built at strategic locations throughout the country.

The South Chicago slag plant is located adjacent to the 1,275-ton blast furnace which furnishes pig iron and hot metal used in Republic's production of steel for aircraft

By WILLIAM M. AVERY

and gun bloom applications. The molten slag, at temperatures ranging from 2,400 to 2,600 degrees F., flows through an open runner from the furnace to the granulator. Water is sprayed on the material as it drops on the paddle of the granulator. The wheel, which rotates at 500 r.p.m. in a horizontal plane, propels the slag at high velocity through a portal in the housing and impinges the material against the face of an adjustable steel collector target. By varying the distance of the collector target from the slag granulator, the cellular structure of the product can be controlled .within reasonably narrow limits; larger cells, and consequently a lighter product, are produced by increasing the distance. Dry, granulated slag can be produced by removing the collector target altogether.



The 54-inch granulator into which molten slag flows from the 1,275-ton blast furnace.

Water sprays in the enclosed expansion chamber effect a further reduction in the temperature of the slag, and the steam thus generated is removed through a natural-draft stack. The expanded material collected on the target drops into a concrete pit and is carried up an incline by means of a 5-foot-wide by 58-foot-long drag conveyor which feeds the cooling dock.

The reinforced-concrete cooling dock bears a close resemblance to the grandstand section of a stadium. The dock slab is built on a slope of approximately 1 to 1 and rises about 24 feet above grade on the back, or high side. The structure consists of

six 16-foot bays and has a storage capacity of about 530 cubic yards. A 5-foot-wide drag conveyor runs from end to end of the dock to distribute slag equally throughout its length. Material of the desired temperature can be drawn through openings in the base of the front wall by means of 30 manually-operated gates.

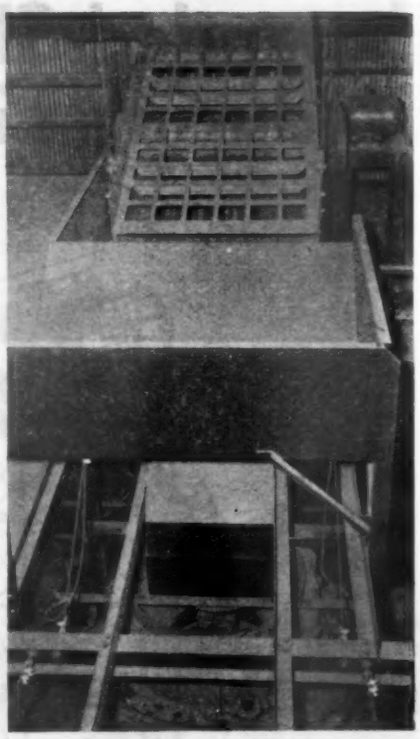
The temperature of the expanded slag when it reaches the cooling dock varies from 500 to 800 degrees F., and about 12 hours must elapse before the temperature drops sufficiently to permit crushing and screening. This time lapse permits slow cooling and annealing so essential to toughness in material of this kind.

The slag from the cooling dock drops on a 42-inch belt conveyor which discharges at the top of the crusher building, about 40 feet above grade. The conveyor has a capacity of 44 tons per hour at a speed of 100 feet per minute and is approximately 272 feet from head shaft to tail shaft. The section which flanks the cooling dock is in a concrete pit, and the rise starts about 105 feet from the tail shaft.

The slag is discharged onto a 5- by 10-foot double-deck vibrating screen where oversize pieces are scalped off by means of a heavy grill with 8-inch square openings. The occasional large particles which cannot be forced through the grill drop onto a steel platform where they are broken by hand and replaced on the screen. The openings in the bottom screen are ½ inch wide by 3 to 3½ inches long, and approximately 20 per cent. of the total feed passes. This minus ½-inch material is removed from the circuit without crushing, while the minus 8- plus ½-inch slag goes to the primary crusher, a 4¼-inch Symons standard-head unit, where it is reduced to minus 2 inches.

The crushed material is discharged onto a 24-inch inclined belt conveyor which elevates it to a steel tower outside the crusher building, where the slag drops through a chute onto a second inclined conveyor and reenters the plant. The remainder of the crushing and screening circuit consists of a 5- by 10-foot single-deck vibrating screen, with ½-inch by 3- to 3½-inch openings arranged in closed circuit with a Symons 4-foot low-head cone crusher which reduces the slag to minus ½ inch.

The minus ½-inch slag is conveyed by means of a 24-inch inclined belt from the screen to the top of a second steel tower, located between the crusher building and cooling dock. A 59-foot cross conveyor from the tower to the top of the storage bins discharges on a 5- by 10-foot double-deck vibrating screening fitted with ⅜-inch and No. 4 cloth. The entire output of the plant passes over this screen and is split into 3 aggregate sizes; 10 per cent. of the total is minus ½- plus ⅜ inch, 40 per cent. is minus ⅜-inch plus No. 4, and 50 per cent. is minus No. 4. The 4-compartment steel bin has a total capacity of about 870 tons of finished product. The supporting columns straddle a rail siding for loading into open-top cars, and sufficient head room has been allowed to permit spouting the slag into trucks



View in the crusher building. The 8-inch-square openings in top deck of screen scalp off oversize pieces. These roll onto the platform, where they are broken by hand and returned to screen. Guards for the V-belt drives had been built but not installed when the photograph was taken. The primary cone crusher is visible below.

Expanded slag on the cooling dock. The material is allowed to cool here for about 12 hours before being drawn through manually-operated gates—visible at the base of the retaining wall—onto the 42-inch belt conveyor which feeds the crushing and screening plant.

on a roadway paralleling the bins. It is anticipated that most of the shipments will be by rail.

As this is written, complete operating data on the plant are not available, and trial runs which began about the middle of July are still in progress. There is every indication, however, that the plant's theoretical capacity of 350 tons of processed slag per day will be attained easily.

Every effort is made to produce the lightest possible material that will conform with A.S.T.M. standards for light-weight aggregate. Used in the proportions generally employed by block manufacturers,

The 24-inch belt conveyor which elevates minus ½-inch slag from the crusher building to a steel tower opposite the storage bin.

these materials will produce an 8- by 8- by 16-inch unit weighing about 28 pounds, compared with about 44 pounds for a comparable sand-and-gravel unit. Concrete made with Celocrete aggregate is said to have excellent durability and workability,

View of the collector target beyond the granulator. Expanded slag is removed from pit below by a 5-foot drag conveyor.

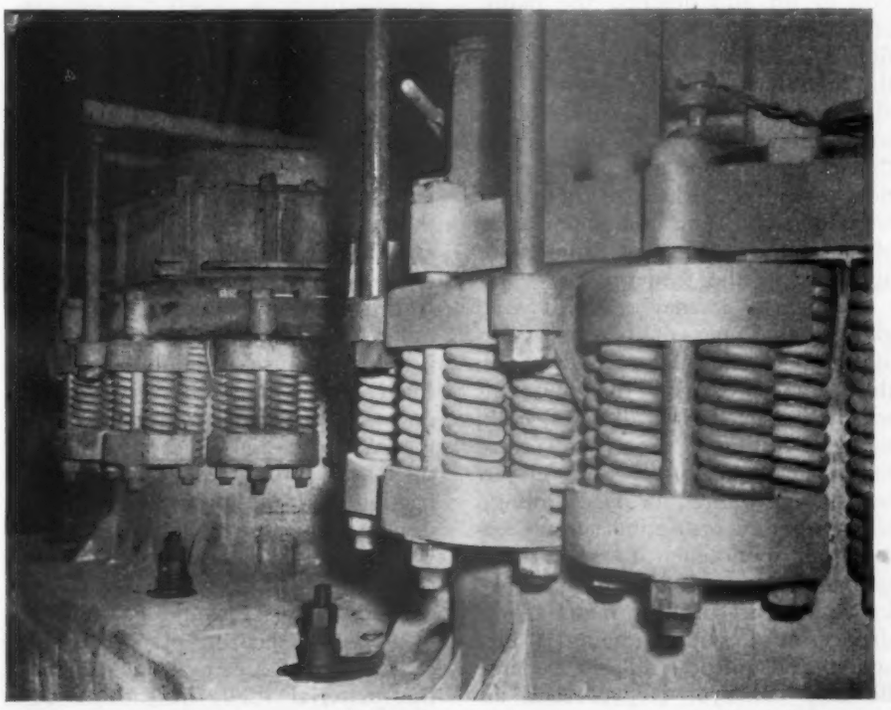
and to provide a high degree of insulation against heat and sound.

High 1944 Barite Output Followed by Decline

Production of primary barite was 136,437 short tons in the fourth quarter of 1944 compared with 106,639 tons for the comparable period of 1943, according to the Bureau of Mines, United States Department of the Interior. Production in 1944 as indicated by monthly canvasses reached 516,582 tons, compared with 410,633 tons reported in quarterly canvasses for 1943. Primary barite includes crude lump and pebble barite (except hand-mined barite) from all states except Arkansas and includes ground barite produced by flotation in Arkansas.

As compared with the third quarter, production was down 14 per cent., owing in part to seasonal shut-downs and in part to exhaustion of some of the low-cost reserves in Georgia and Tennessee.

The shortage of barite for oil-well drilling muds was accentuated by several blow-outs, some of which, it is said, could have been avoided by adequate supplies of barite. Grinders are several months behind in filling orders for well-drilling barite, and despite new production in Missouri the situation is not expected to improve soon, owing to the expanded program of well drilling in 1945.



The primary and secondary cone crushers are mounted on a common foundation below the screens.

Tatko Brothers Find Diesel Power A-1 Aid

Tatko Brothers Slate Company, near Middle Granville, New York, the largest slate quarry in the Empire State, has established outstanding production records by modernizing and improving their methods.

The Tatkos' first experience with Diesel power came when they pur-

John Tatko Operating the D7.

chased a Caterpillar Diesel D4600 Engine to power the mine hoists and two air compressors. Later they increased considerably the efficiency of their operations by adding a Diesel-powered tractor, equipped with a bulldozer, to perform various jobs around the pit. Now, according to current plans, a pallett attachment will be devised to be attached to the front of the tractor—a Caterpillar Diesel D7—to assist in loading and handling the finished product.

At present the tractor-bulldozer combination strips away overburden at the quarry site, cleans up waste slate accumulation, moves cable ways, tightens the cable, hauls material and supplies and enlarges and maintains work benches.

Factors Affecting the Movement of Material through Bins, Gates and Feeders

By WOLF G. BAUER
Consulting Engineer

another P&Q exclusive

JUDGING from installations that can be seen in almost any materials preparations plant, it is quite apparent that there is a forgotten science to which technologists and operators could well turn a more attentive ear. The phenomena attending this science are little investigated or understood, and troubles ensuing from a lack of understanding and recognition have been taken for granted and treated as necessary evils. Rather than attacking the problem of handling materials through surge, storage bins, and feeders as an integrated whole, emphasis has been placed on the type of feeder or some single isolated accessory.

The bin is probably the most widely used and misused piece of equipment in a plant. To most of us it is simply a container or large box on legs into which we throw bulk materials. But in modern processing, where cost and quality are all-important, the lowly bin should be looked upon as a piece or system of machinery, the design and application of which have a very definite and real bearing on the cost and quality of the material handled through it.

Bunkers, concrete silos, steel or wood bins, and surge hoppers all have this in common: material must be fed, must remain and be confined, must be in condition to move through, and must be discharged from the device. As most of us will concede, this is not always a simple problem with some materials. To accomplish this efficiently, the bin shape must be such that there is the minimum amount of breakage and segregation, with the maximum freedom of down-flow. Visual or automatic control for depth of filling may be required in many instances. Accessory mechanical expeditors inside or outside the bin are often an indispensable adjunct to prevent flow stoppage. Correctly designed and applied bin discharge openings, gates, and feeders are paramount. It can be seen at once that here is an integrated system or equipment which, although made up of several more or less standard components, must be engineered as a whole to fit the many conditions materials will impose upon it.

It is the purpose of this paper to treat the subject from the material flow standpoint and to point out the factors which influence the efficiency of operation. Relatively little basic research has been done on this, and the material here presented is not the outcome of an investigation or patient study, but rather is drawn from observations and conjectures made by the writer both in the field and with models. The factors indicated and reasons given should invite discussion, study, and stimulate more thought in designing installations.

Probably nowhere in the small and medium-sized nonmetallic minerals preparation plant is there a better opportunity to do more good at less cost in the matter of saving on labor and interrupted production than at the many points of handling material between stages of manufacture. At these points mechanical feeders play an important role, as they direct the traffic, so to speak, of material movement from and into the many conveying and processing channels.

It is not the object of this discussion to list and describe the many and various feeders, as this information is available to most readers in the manufacturers' catalogs and engineering handbooks. Rather shall we interest ourselves in the factors that make for good and poor operation, some basic principles that must be understood, and the importance of correct designing of equipment accessory to the feeder itself.

Strange as it may seem at first glance, all types of feeders work along the same pattern and exert the same effect on the material which they feed. In all cases, bulk material resting in an open or confined pile is subject to flow, either by rolling, sliding, or free falling, whenever any restricting surface or material, upon which it exerts gravitational force, is removed. To remove such restricting material or surface at a suitable point is the action and purpose of all feeders. Be they conveyor feeders such as apron, flight-chain, belt, or screw, or vibrators, rotary paddles, disks, rolls, plungers, reciprocators, or shakers, they all bring about a more or less vertical down-travel by sliding, rolling, or free falling of the bulk material mass within the confines of the bin, silo, or pile.

When examined in its minute detail, the slow down-flow or movement of the mass of material under the influence of an operating feeder is usually not continuous, as with a liquid. Some finely-sized and free-flowing material may flow practically in a continuous stream when the lineal velocity through the container is high, but in most instances the flow is spasmodic or periodic-continuous, each grain or particle awaiting its turn of movement until the restricting particles to the side and below it have moved and so removed the restricting influence holding it in position.

A mass of broken solids moves downward by gravity in two ways. It moves *en masse*, much as a viscous liquid, or it obtains a lower level by an undulating wave-like action in which layer upon layer hesitates and then falls into and fills the void space left by the fallen layer immediately below it.

Continuous En Masse Flow The *en masse* downward movement of bulk material is not particularly restricted to any sign of particles, and aside from any influencing physical characteristics, it is a function of total through-put rate in vertical containers in which the ratio of container cross-sectional area to particle diameter is large, the sides of the container are steep, and the wall friction is low. Of course, it should be understood that we can have *en masse* down-travel of only some portion of the total material in the container, such as a bin. In that case, wall-friction and the disposition of the discharge opening would bring about such a laminar flow that only a certain portion of the vertical column of bulk material would be moving at all with a shearing plane between cross-sectional area to particle diam- the material itself, instead of between the material and the wall. In a rectangular bin with a sloping bot-

tom, the travel may be down along the vertical front wall only.

En masse down-travel presupposes the translation of a vertical or inclined column of material such that the flow rate in the lowest section of the moving column is the same as that in the highest section, and all material is moving simultaneously in the column. In this state, the particles are loosely packed, freely moving about, and the whole acts as a very viscous pseudo-liquid. Such a condition is enhanced by low specific gravity, dryness or extreme wetness, roundness and smoothness of the particles, low column height or material head, steep sides, vibration, air entrainment, a narrow particle size range, lack of segregation, and most important of all, a high rate of withdrawal through a small container cross-section.

Relatively little feeding trouble is experienced with material that reacts to the feeder in such a manner. However, most material will not travel *en masse* through the bin because one or more of the above-mentioned conditions do not hold. It is rather with the non-freeflowing conditions and material that we are most concerned. In order to appreciate the limited role of the feeder and the more important accessory designs influencing the feeder installation, let us briefly discuss some of the factors and phenomena that often "jam the works" of our feeding operation.

Hesitant Flow and Arching Hesitant or unsteady flow may be continuous as far as the feeder flow is concerned, but it brings on the first possibilities of arching and hanging in the bin or bin throat, and may call for changes in bin and bin discharge opening. In an earlier paragraph we mentioned that bulk material travels also downward through a container or bin in a wave-like or undulating motion. This was studied by the writer behind glass partitions, and can often be observed or heard in bins or vertical kilns. This action may be likened somewhat to the action of a liquid through which air escapes in the form of bubbles. Small and short-lived though the cavity below the arching layer may be, it seems to travel upward through the material either slowly to the point of stalling or rapidly in a swift ripple. Such flow causes alternate impact and jamming which compacts material and further aggravates hanging and arching.

There are numerous conditions that inhibit free flow through the bin, bin throat, and feeding device. They may be grouped in two divisions, those which arise from the nature of the material itself, and those which are due to outside conditions. In the former we would include: the shape of particles; the sharpness of the edges and roughness of the material; temperature variations in relation to entrained air humidity and dew-point; friability; particle-size range; the amount of entrained dust mechanical moisture; specific gravity; hardness and the ability to accumulate electric static charge. In the latter division should be mentioned the shape, slope and roughness of the container walls, the depth and the material head, the time allowed to settle and remain in the bin, vibration of the bin structure due to other vibrating machinery; corners, sharp surface breaks and projections within the bin or throat, the height of the material fall in filling the bin, the segregation of sizes due to the filling method; improper throat constriction; and slow or intermittent discharge.

In discussing the nature of the material which is troublesome to feed out of bins, let us arbitrarily divide it into sandy to pulverulent material and that which contains coarser sizes up to large boulders. If we were to list materials as to size only with respect to their arching or hanging-up tendency, we would probably place large crushed pieces first as being the most difficult to feed out of bins, with very fine pulverulent material a close second, and intermediate sizes last. With very fine sizes, it must be realized that the tremendous surface area and number of contact points bring forces to bear which are not apparent, and would not have any influence on the larger fractions with which we deal. The absorption of films and film tensions exert capillary forces of great magnitude holding particles together, the interlocking of grains, swelling or shrinking due to wetting, drying, or temperature changes; and the capacity to hold electric charges, all have very noticeable effects on fine material. Due to lower bulk density and, therefore, greater mobility and compressibility, jarring, vibration, and pressure have telling effect on compacting the mass. With large-size materials, on the other hand, particle-size range, particle shape, and the size of the discharge opening are of greatest influence. The role of fines, whether they are present in the original bin feed or are created by impact and attrition during filling and discharge, is an important one, and a factor which we can usually deal with in some way.

To understand the role of fines among coarse particles, let us see in what ways they can upset flow conditions through the bin and the feeder. All the material which is fine enough to move freely between the coarser fractions will have considerably greater downward velocity, tending to accumulate in the bin bottom, dead corners, or slower-moving zones. As the interstices of the large particles become filled, their mobility and shifting freedom become more and more restricted, and, we might say for comparison, that rolling friction is changing to sliding friction in these zones. If these zones are allowed to remain in such a condition, the packing and density increase to a point where it is quite difficult to break the material loose. If such a compacted mass should break or slide off into the looser moving zone, it will then tend to plug and stop the flow. In

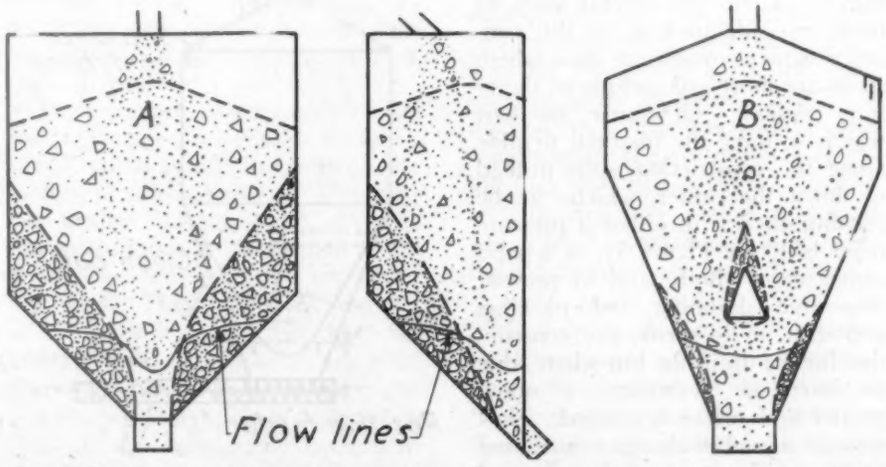


Fig. 1—Effect of bin shape and fines on flow. Slow-moving sides accumulate and pack the material. Compare bin size to live storage in bins A and B.

bins with sloping bottoms and side discharges, this is an especially common occurrence. Not only are time and labor wasted in order to coax the material through, but variable

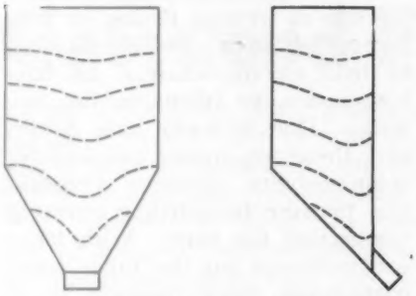


Fig. 2—Displacement lines showing relative flow in typical bin cross sections.

quality of the discharge is a certain result.

Before we take up feeders, feeder connections, and feeding, let us draw some conclusions from the factors that influence the flow of material through bins. All bins have a constriction or discharge-hopper throat at the bottom for the purpose of directing the material to the discharge opening. This constriction causes laminar flow or differential flow rates in various sections of the bin. The greatest flow rate is usually directly (vertically) above the feed opening, which, in a sloping-bottom bin, would be near the vertical wall above the side discharge opening, and down the center of a symmetrical, bottom-discharge bin. (Figure 1). Differential flow is most pronounced in the constriction and produces there a further constricting effect due to the accumulation of fines and a large and more direct pressure component against the sloping walls of the constriction. (Figure 2). The material in effect molds its own channel or flow cone, whose sides or shearing surfaces are always steeper than those of the container. There are several ways to break up side packing in the constriction of symmetrical bins where spans are short and arching is, therefore, possible. Of course, the best way is to force the material to slide along the constricting walls instead of down the center, which can be accomplished with either a pressure relief bell (see Figure 3), or a solid center core. Both tend to prevent stop-surge slumping and packing, and shift, so to speak, the constriction higher up in the bin where, due to increased perimeter, a much greater flow orifice is created. Flow into the actual discharge constriction is then without great pressure and surge head, and material is in a looser condition at the critical point of discharge. This is sometimes accomplished by an offset hopper to relieve the pressure at discharge or on the feeder under discharge. Often a steel plate hung into the arching zone will tend to minimize arching.

If poor design, such as small feeders and discharge opening, coupled with sloping sides which are not sufficiently steep for clean sliding of the material, cannot be altered or improved for some reason, then hopper vibrators, tappers, high-pressure air taps, a revolving paddle shaft in the arching zone, heat, or even electrolytes, salts, or substances added to the material, may have to be resorted to. With a tapper or vibrator it is good practice to cut the bin hopper just a little above the arching level and re-hang it non-rigidly between the feeder and the bin so that the full vibration effect is achieved in the critical zone. This requires considerable overlap at the break. Air pressure taps should be placed at several levels, and a revolving stirrer shaft should be located slightly above the arching level. In some climates, electric or steam heater coils must be employed to prevent the material from freezing, and in this connection the use of so-called "black light" rays may eliminate troubles from this source. All these devices are not complete remedies as they do not remove the causes.

If the material can be improved as to sizing, drying, or methods of introduction, that should be attempted. If at all possible, the material should be discharged from bins simultaneously with filling, so that packing due to impact is minimized, and the bins contents do not set before the material is withdrawn. Bins or silos of great depth should preferably not be emptied but kept as full as possible to prevent breakage of the material. Material should be charged centrally and vertically in order to get symmetrical piling. In a round or square bin, this will cause the fine material to move down the faster center and prevent clogging along the slower-moving sides. It is, indeed, poor practice to fill a bin from a side chute for the obvious reason that variable quality discharge and arching troubles usually ensue.

In the connecting arrangement between the bin and the feeder, there must be provisions to close the bin opening completely to allow the feeder to empty itself, and a sliding or swinging gate to regulate the depth of the material on the feeder by such positive movement that any position may be duplicated and can be indicated by notches, holes, a wheel, or a lever position.

Feeders Earlier we made the statement that all feeders have the same initial effect on the material in the bin, namely, that of removing a portion of the material in the discharge opening and so causing the material immediately above the removed section to cave or slide in, an action which continues upward either in an undulating wave or as a simultaneous *en masse* movement. It is, therefore, only the exact manner in which the

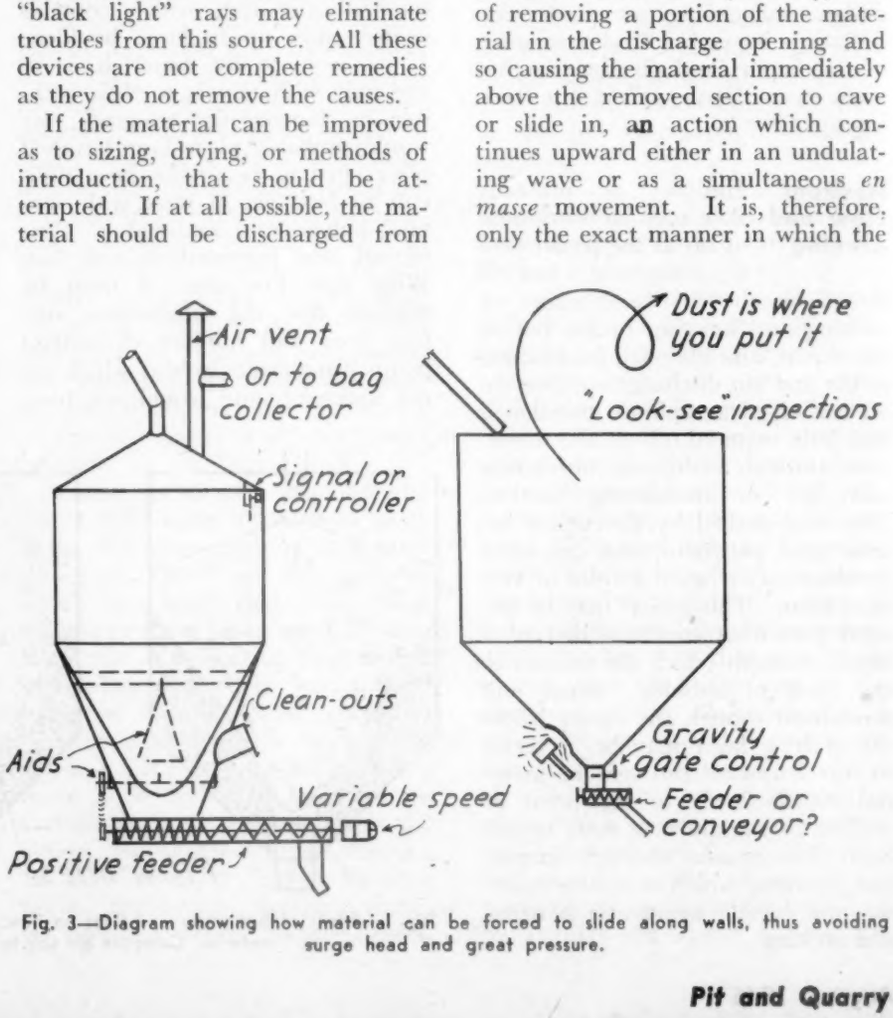


Fig. 3—Diagram showing how material can be forced to slide along walls, thus avoiding surge head and great pressure.

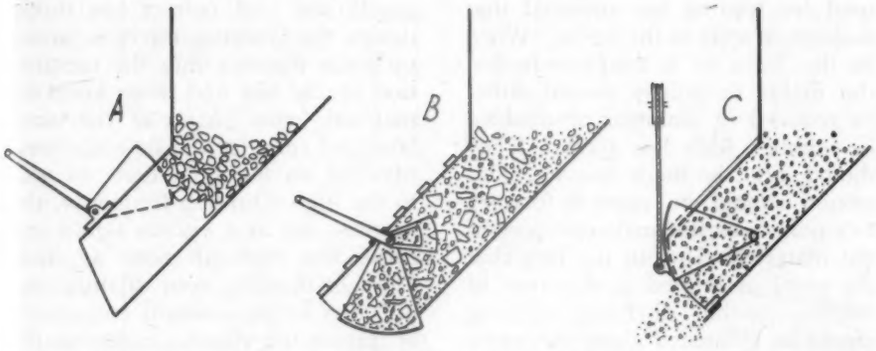


Fig. 4—A, for sized coarse material. B, for mixed sizes of great range. C, for finer sizes; can be made leak-proof.

feeder removes a section of material and thereby brings about this caving-in or sliding, that differentiates one feeder from another.

The simplest type of feeders are gates which are operated by hand levers or, under control of an operator, by steam, air, hydraulic piston, or motor drive. Gates are either sliding or hinged plates, operating in any position from vertical to horizontal, and covering the bottoms, sides, or chute ends of bin opening. Without going into the salient features of each type of gate, it may be pointed out that, except with very free-flowing material, side discharge gates can, also, be adapted to bottom bin-discharge openings by adding an offset chute or apron to the opening and operating the gate from the side.

The best type of gate for material of one inch or larger is a curved segment type which can be arranged in three different ways, depending on the material and whether or not the gate must be leakage-proof as for finer material. These are illustrated as in Figure 4, A, B, and C. It will be noted that each of these gates operates in conjunction with a chute. Due to their pivot action and quadrant blade, friction on the material is minimized, and opportunity for counter-balancing is evident. It should at once become apparent that a gate for material of coarser grade and tending toward hesitant flow need not close the bin opening, but that the only requirement is that of constricting the flow channel to a degree which brings on artificially created arching or plugging. Feeding fine material continuously by gate control and gravity is only justified when it is absolutely free-flowing under the conditions and restrictions of the feed channels.

Since gates are chiefly used to discharge material rapidly in cycle or batch operations, the time factor of hand feeding must be cut to the minimum, not only to fit the best schedule or cycle, but to save on labor cost. This can be done best by considering the following two important points:

1. Reline the inside of the bin so that all the flat slopes, corner angles, pockets, and surface of bottom are streamlined, steepened, and smoothed, and the bin will empty itself completely. Allowing material to collect in dead pockets and along the bottoms and walls is much more wasteful of room than giving the inside surfaces the correct slope and the openings the right cross-sectional area, even at the cost of elevating material higher to gain volume.

2. Redesign the openings to the gate so that arching does not occur, at the expense of a much larger gate or combining several gates into one. Sometimes (with coarser material) the use of a double gate, side by side, operating individually from a common shaft and giving a discharge opening of twice the former length without interference of an intermediate post in the opening, will prevent arching and save the expense of a larger gate.

Whenever an operation, which must be performed cyclically and at undetermined intervals, requires an operator to bar and poke wedged material around a bin opening, up to 10 per cent. of the bin cost can be justified in redesigning such a zone of trouble.

The operation of continuous feeders, as much as periodic feeds or simple gates, is influenced by all the factors mentioned so far. Continuous feeders often become anything but continuous or automatic, and constitute, therefore, an important cost item. They justify considerably more investment in size and accuracy than is generally accorded them for the sake of cheap and trouble-free operation of themselves and all the subsequent equipment tied in with them.

The continuous feeder must regulate flow by weight or volume. It may be defined as a mechanical moving device so placed in a stream of material, otherwise free to fall, roll, or slide, that its presence acts as a dam or baffle, absolutely preventing gravity from setting such material in motion except at periodic intervals or at a continuous rate governed by its own positive motion.

Feeders can be arbitrarily grouped as self-contained feeders and feeder-conveyors, depending on whether they feed from the bin to a conveyor or act themselves as a combination feeder and conveyor. It should be realized that if a feed-conveyor is regulated by automatic control, there would be considerable lag in the feed changes if the flow should be controlled by the gate at the feed end. In such instances, feeders are controlled by speed changes. Under this grouping we find the apron or bar conveyor, live grizzly, belt conveyor, screw conveyor, flight and drag-chain conveyor, bucket elevator, and some types of pneumatic conveyors readily adaptable to feeding from bins. The self-contained type includes undercut chop feeders, lifting apron feeders, roll or drum feeders, rotary star feeders, reciprocating feeders, revolving-disc feeders, plunger feeders, shaking feeders, chain feeders, and vibrating feeders. Feeders can further be classified as to whether or not they control the feed by weight or volume. When the material is uniform in size and quality, volume control is usually sufficiently accurate; however, when variables due to bin segregation or other factors cause changing bulk density, then weight might have to be controlled. This can be done by the continuous or cycle method. The continuous method, such as represented by the constant-weight feeders, is based on pivoted measuring scales affected by feeder load weight, changes in load being counteracted by changes in the gate opening or feeder speed. The cycle method is continuous-periodic and usually employs an additional weighing unit such as a pivoted container or a moving belt, acting as a scale which trips automatically upon reading a definite weight from the feeder.

As a rule, feeders should be hooked up mechanically or by automatic control in such a manner that they will stop feeding whenever the device they are feeding stops. They should be easily accessible and spare parts should be kept on hand for immediate repair.

In choosing a feeder, the following factors should be considered: Can it be easily and quickly adjusted for flow rates? Has it a wide range of adjustment? Is it strong enough to cover the maximum bin opening necessary to bear the pressure of material? Is it resistant to particular conditions of heat, dampness, shock, chemical action, and choking due to surge or fines? Must the material be additionally baffled to prevent surges to upset steady flow? Is it adaptable to screening while feeding? Will it remove material uniformly from the discharge opening cross-section? What are its requirements as to headroom, power and dust protection? Is it self-cleaning? Will damp material have a tendency to stick to it in times of wet weather? To what limits of feed fluctuation will the feeder deliver? Many more requirements could be cited.

If the material to be handled is free-flowing, it is a relatively simple matter to adapt or even design and build a feeder which will deliver a constant volume of it. It is possible to devise any mechanical movement with adjustable speed so that it will cut through or under a mass of material that has come to rest in a channel or lip in front of a bin opening in such a way that its angle of repose prevents further flow and the height of the surface is constant. The feeder, which may or may not support the mass, needs simply to disturb or change the angle of repose, by causing a definite volume of the barely resting mass to be removed, in order to cause the material to fill in by gravity to resume static equilibrium. If the device revolves or moves continuously by a succession of rapid shakes, this described cycle appears as a practically continuous flow motion. Studies made by the writer have shown that material which is resting directly on a reciprocating, vibrating, and belt or pan feeder moves down more rapidly above the back end of the feeder when the adjusting gate is relatively low and the bed shallow. As the gate and bed depth is raised, material will move down at an ining, in that of feeder size to stone creasing rate above the gate side of the bin, and the flow becomes more even through the bin throat. Also, an upward-inclined feeder draws more material from the back end of the throat; whereas, a downward-inclined feeder draws more from the gate end.

The screw feeder is very often used for feeding fine material that will flow readily to the screw. When in the form of a conveyor-feeder, the flights or helixes should either be reduced in diameter or doubled in number with less pitch. They should, also, be made heavier. This section should be carried forward to a point past the angle of repose of the material. Due to the fact that the width is limited in this type of feeder, the bin discharge opening should be elongated along the screw axis in order to achieve the maximum opening, and so minimize hanging-up tendencies. Slow speed can often best be obtained by a pawl and ratchet, although variable-speed reduction drive is preferred. These feeders can be set at an incline at some loss in capacity. They are not very well suited to material that is fluffy or aerated and may surge or flow past the flights.

Rotary segmented or star feeders are usually employed where there is danger from surging, where the feeder may act as a measuring device, or is needed to form an air-lock, as for feeding vessels under suction or pressure. They are poor feeders when sticky material is encountered and should be provided with shear pins or hinged-plate tramp-iron catchers. The discharge opening is not limited in length but to the diameter of the feeder in width. Ample size at slow speed provides better sliding action of the material from pockets but does not give as steady a stream.

Reciprocating and shaking feeders are quite common and are suited to coarser materials which have a tendency to arch. This type is simple to build and keep up; does not jam or foul itself; can be used as a combination screen, grizzly, and feeder; and allows four different adjustments: stroke, speed, gate opening, and slope. Their greatest advantage, in the writer's opinion, however, lies in the practically unlimited width or length in which they may be designed for difficult material. They are not too well suited for easy-flowing, powdery material which has a tendency to surge.

Vibrating feeders are similar to vibrating screens and may be employed for a combination use as feeder and screen. They lend themselves to accurate and close flow control, large dimensions, several types of adjustments, and consume relatively little power. Handling material of any sizing, they are particularly adapted to that which is not free-flowing. With a unit of ample size and correct bin throat design, the vibration effect is carried up some distance into the constriction of the bin and helps keep the material loose. Most of the usual laws and rules for the flow of coarse material do not hold here, as, due to the high vibration frequency, the particles act as a viscous liquid and cause the mass to flow as such. Flow is possible even slightly uphill, due to the forward component of impact the vibrator exerts on the particles.

Belt and pan-conveyor feeders are generally used with coarser-sized material. The belt feeder lends itself to continuous, constant volume or weight feeding. Wide, slow-moving belts should be employed with a large number of closely spaced, supporting rolls under the feeder section carrying the bin load. It is good practice to use variable speed drives, as it is best to run such feeders slowly with a deep bed of material, rather than fast with a shallow bed, the latter practice bringing on troubles due to excessive friction.

Pan feeders are more rugged and more suited to coarse, abrasive particles. They can be used to feed material at elevated temperatures. When bars or rollers are substituted for pans, they allow the fines to drop through and act as live grizzlies. When made of high-carbon or manganese-steel, pan feeders are able to resist high shock loads, as encountered in dumping shovel-size rock into a surge bin whose bottom consists of the feeder itself. Often the placing of structural-steel members about ¼-inch below the pans at the point of greatest shock will prevent sagging and kinking of the pans. These types of feeders may be set at inclines up to 25 degrees from the horizontal and are, therefore, useful when the head room is limited. In feeding crushers and the like with pan feeders loaded by trucks through surge bins, it is best practice to carry a cushion load on the feeder at all times and design the hopper large and deep enough and the feeder wide and strong enough to maintain such a load for protection. Whenever it takes one or more men to help feed a primary crusher, some mistake has been made in the ratio of shovel size to crusher open-size, or in the shape of the receiving hopper. Clutch control of the feeder by the operator is generally less costly in the long-run than on-off motor switching. The feeder should run at such slow speed that it need

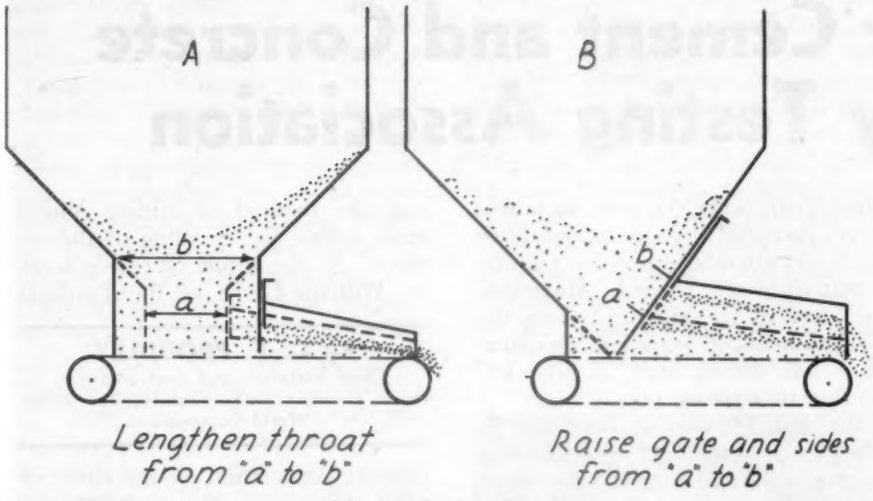


Fig. 5—Bin throat may be enlarged by lengthening it; or feed gate opening may be raised, if it is in a slanting position.

be started and stopped only at special times. In other words, with the designed height of carrying materials, the feeder should not be able to overfeed the crusher.

One type of chain feeder is also frequently used for feeding large pieces from bins and bunkers and lends itself to large discharge openings. The bottom slopes should be made extra steep and the chains should be of ample weight.

There are numerous other feeders used in industry, but, as pointed out earlier, we are more concerned here with the factors of flow than with the novelty of feeder designs. The fundamentals are simple, and, once understood, suitable feeders can be chosen or designed for the job.

If there is one cardinal role we should observe, it is to use the largest possible feeder and bin discharge opening the installation will warrant. There are two ways to increase the flow area in the throat without increasing the width of the feeder. The bin throat can be altered by lengthening it parallel to the feeder axis (Figure 5, A), or the feed gate opening can be increased upwardly when this gate is in a slanting position on the bin-hopper (Figure 5, B). The first method increases the load of material on the feeder due to bin pressure; the second method increases the load by greater bed depth on the feeder and requires higher skirt plates. Both methods are especially recommended for belt, pan, or screw feeders and drag or flight chains that act as conveyors, the width of which can not be altered in existing installations. In both cases the feeder must be slowed down.

In observing average practice in plants of all sizes and types, it can be said truly that the time-saving elements that should be built around the flow of materials through bins, gates, and feeders have been largely overlooked due to misunderstanding of factors and functions involved, as well as to the lack of an operational cost analysis. The shapes of bins and the size of openings for gates and continuous feeders have followed past practice instead of a practice that candidly weighs first cost against operating cost. We must not only consider the cost of an operator's time, but also subsequent accumulative costs due to quality changes, production loss, and man-hours lost in succeeding linked-in operations. If we give the pull of gravity a chance to exert itself, we can have automatic feeding without the periodic or continuous attendance of an operator. To give material the opportunity to be moved by gravity, we must remove interferences and re-examine the size ratios of different materials to the feeding channels, all in the light of changed operating costs and cost distribution. It is hoped that some of the influencing factors and fundamentals mentioned may stimulate the reader and operator to search for more, and then apply himself to a much-neglected phase of operations.

The Republic Mining & Manufacturing Company, subsidiary of the Aluminum Company of America, announced that it had changed its name to Alcoa Mining Company. The reason given for the change was to identify the bauxite-producing firm more closely with the parent company.

New Jersey's Minerals To Be Studied in Survey

A geological and ceramic study of New Jersey's mineral resources by a new bureau of mineral research at Rutgers University will seek a remedy for the ills of the state's mineral industry, which has dwindled in output, income and employment in recent years. New Jersey's mines, quarries and clay pits in 1929 yielded products worth $72,000,000; but by 1943 the value of their output was down to $38,000,000.

The new bureau will be directed by Dr. A. K. Snelgrove, chairman of the department of geological engineering of Michigan College of Mining and Technology, who has been named professor of geology at Rutgers. He will work in cooperation with Meredith E. Johnson, New Jersey state geologist.

Demand for Fluorspar Still Exceeds Output

For the seventh successive month fluorspar output fell behind consumption in May. Much production was lost in Kentucky because of heavy rains. Shipments were the largest since October, 1944. The Rosiclare Lead & Fluorspar Mining Company, Rosiclare, Illinois, closed because of flooding in March, resumed hoisting ore on May 20. The flotation mill of Indian Metals Company, Lordsburg, New Mexico, and the heavy media plant of Western Fluorspar Corporation, Walden, Colorado, shut down several months for repairs, reopened in May.

New Sand & Gravel Plant To Produce 500 Tons Daily

F. L. Galloway of the Galloway and Jeffery Sand and Gravel Company, Batesville, Arkansas, reported that the firm's new plant was nearing completion. Mr. Galloway said that he estimated the plant would handle 500 tons of sand and gravel per day.

U. S. Lime Products Mining at New Quarry

It was recently revealed that the U. S. Lime Products Company, which has been quarrying and milling its product at Sloan, Nevada, for the last quarter-century, will move its mining operations to a quarry seven miles west of Apex on the Las Vegas to Salt Lake City highway.

New Tests for Cement and Concrete Considered by Testing Association

GREATLY curtailed by restrictions on travel, the Forty-eighth Annual Meeting of the American Society for Testing Materials was held in New York City on June 27 for the purpose of conducting essential business. Committee meetings and the presentation of technical papers were relegated to correspondence and distribution in printed form. The loss of personal contact and group discussion will be felt keenly by many of those who under normal circumstances would attend the annual meeting, but there will undoubtedly be an abundance of written discussion submitted before the Annual Proceedings go to press and, therefore, the real students may benefit through the society's compliance with the ODT's regulation.

Those fortunate enough to attend the New York meeting concluded the official business of the day with an evening session sponsored by the New York District Committee, at which the retiring president, P. H. Bates, gave his address on the *Preparation for the Future of the A.S.T.M.* This was apropos of the recent formation of two new A.S.T.M. committees: an Administrative Committee on Ultimate Consumer Goods and an Administrative Committee on Simulated Service Testing, the activities of both of which will vastly broaden the field of influence of A.S.T.M. specifications. A guest speaker, Rear Admiral Lewis B. Combs, Assistant Chief, Bureau of Yards and Docks, spoke on *Preparing the Way for Victory with the Seabees* and followed his talk with the premier of the Navy film on the erection and use of the floating dry docks.

Committee reports, some of which have been mailed to society members, show that although the research activity of most of the subcommittees has suffered because of shortages of labor and technical assistance, progress has been made in the promulgation and revision of standards and tentatives. Adoption of 35 formal standards previously published and adoption of revisions in 40 existing standards was possible only as the result of action of the society at the annual meeting. This made the one-day session imperative. During the year 55 new tentatives were accepted by the Committee on Standards and numerous existing tentatives were revised. Altogether the work of the committees on the development of standard specifications has shown little, if any, letup due to wartime conditions.

PIT AND QUARRY readers will be particularly interested in the reports bearing on cement, concrete, lime, refractories and masonry materials

J. R. Townsend, new association president.

which, in years past, have occupied two days of the customary five-day meeting.

Cement Specifications Committee C-1, under the Chairmanship of P. H. Bates, Chief, Clay and Silicate Products Division, National Bureau of Standards, who has also been the president of the society during the past year, makes no recommendations concerning standards this year, but publishes as information several proposed changes in specifications for Portland cement (C 150-44), air-entraining Portland cement (C 175-44T), and the method of sampling hydraulic cement (C 183-44).

The Sponsoring Committee on Portland Cement (C. E. Wuerpel, chairman) of Committee C-1 has considered during the past year such subjects as chemical limitations, sampling, testing air-entraining cements and the method of adding Vinsol resin during the grinding of the cement. As the result of recent work by William Lerch of the Portland

By C. E. PROUDLEY
Chief Materials and Test Engineer
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Cement Association on the effect of SO_3 content on the shrinkage of Portland cement, the Committee recommends maximum SO_3 for Types I and III of 2.5 and 3.0, respectively, when the calculated C_3A exceeds 8 per cent. The tricalcium silicate requirement for Type II cement (50 per cent.) is recommended for deletion. The same proposals regarding SO_3 and C_3S are recommended for application to the types IA and IIA in the Tentative Specifications for Air-Entraining Portland Cement.

A *Specification for Portland-Blast-Furnace Slag Cement* is proposed by the Sponsoring Committee on Blended Cements (R. E. Roscoe, chairman) of Committee C-1. Official action is being withheld until an opportunity has been afforded for complete open discussion.

Air-Entraining Cement A timely paper by R. L. Blaine, J. C. Yates and J. R. Dwyer, Associate Materials Engineer, Cement Reference Laboratory Inspector, and Research Associate, respectively, National Bureau of Standards, on the *Testing of Portland Cements Containing Interground Vinsol Resin* gives the results of tests made on 64 commercially manufactured air-entraining Portland cements. Fineness and water requirements of the cements, the amount of air entrained in paste, mortar, and concrete, and the tensile and compressive strengths of mortar test specimens at 3, 7, and 28 days are tabulated and discussed.

The air-permeability test, devised by R. L. Blaine at the National Bureau of Standards for determining the fineness of Portland cement would provide a more rapid method with much simpler apparatus than the present Wagner turbidimeter method (C 115-42). A *Proposed Method of Test for Fineness of Portland Cement by the Blaine Air-*

Permeability Apparatus is being published as information as the result of the widespread interest the method has created. The Working Committee on Finances (R. L. Blaine, chairman) hopes to promote uniformity in test procedure and a volume of information in connection with the method. A co-operative study is also reported by the Working Committee on the Effects of Alkalies in Portland Cement (R. F. Blanks, chairman) on the mortar-bar expansion test to determine its dependability and the degree of reproducibility. Five aggregates and six cements were distributed to the ten co-operating laboratories. Two of the aggregates had been proved non-reactive. The total alkali content of the cements varied from 0.18 to 1.41 per cent. Although the agreement in actual quantitative results was not good, they indicated that reactive expansion is roughly proportional to the amount of alkalies present in the cement and that no expansions were secured with cement containing as little as 0.42 per cent. alkali (expressed as Na_2O 0.658K_2O). The report of Committee C-1 includes additional data on short-time tests for the sulphate resistance of commercial cements and various discussions pertaining to the subject. This study has been carried on since 1940 by the Working Committee on Sulphate Resistance (D. G. Miller, chairman) and this year a suggested procedure for making the lean mortar bar is included in an appendix to the committee report.

Lime Several important revisions in specifications pertaining to quicklime and hydrated lime for structural purposes are recommended in the report of Committee C-7 on Lime under the chairmanship of W. C. Voss, Head, Department of Building Engineering and Construction, Massachusetts Institute of Technology. Changes in the method for the determination of consistency and the addition of a new test for popping and pitting and for water retention of hydrated lime are recommended in the *Tentative Methods of Physical Testing of Quicklime and Hydrated Lime (C 110-38T)*. Also, a tentative revision of the *Standard Methods of Chemical Analysis of Limestone, Quicklime, and Hydrated Lime (C 25-44)*, involving the method of calculating unhydrated oxides on the as-received basis, is recommended. When these changes have been approved, Committee C-7 plans to propose *Tentative Specifications for Hydrated Lime for Masonry Purposes and for Special Finishing Hydrated Lime*, as well as a tentative revision of the *Standard Specifications for Normal Finishing Hydrated Lime (C 6-44)*.

Cement-lime mortars received the attention of G. J. Fink and Emil Trattner, National Lime Association, in a paper on the *Properties of Highly Hydrated Dolomitic Masonry Limes and Certain of Their Cement-Lime Mortars*. Chemical and physical properties are given of six limes of a new type, the highly hydrated

Vice-president T. A. Boyd

dolomitic limes, and the physical properties of their mixtures with Portland cement in the proportions of 1 part cement to 2 parts lime by volume. Tests of 1:2:9 mortars 30 minutes after mixing and after being subjected to 1-minute suction showed high plasticities and high water retentivities. All the limes contained small percentages of unhydrated oxides and had low expansions in the autoclave.

Dynamic Modulus Theoretical aspects of the testing of cement mortars and concrete were scrutinized by Gerald Pickett, Research Physicist, Portland Cement Association, in a critical and practical analysis of the use of the dynamic method for determining Young's modulus, using either prisms or cylinders of various dimensions. This is a valuable contribution for those who are promoting the use of the sonic apparatus as a tool for the investigation of concrete. Mr. Pickett's paper includes a number of useful tables and charts.

Compressive Strength Size and shape of test specimens has an important influence on the efficiency of laboratory and field tests and upon the co-ordination of the two. Two papers by John Tucker, Jr., Chief, Cement and Concreting Materials Section, National Bureau of Standards, go into this matter in a most interesting manner. His examination of the *Effect of Dimensions of Specimens Upon the Precision of Strength Data* shows how the mean strength and scatter in strength may be predicted for specimens of different dimensions and how dimensions may be advantageously selected. The other paper gives an *Analysis of the Effect of Length on the Strength of Compression-Test Specimens*. The correction for specimens having a ratio of length to diameter of less than 1.5 depends largely upon the strength of the concrete, and it is fallacious to use one correction factor for a specimen of one length-diameter ratio for all concretes. He recommends the use of compression-test specimens having a length-diameter ratio between 1.5 and 2.0, even though so doing may require a diameter of specimen to be only twice the diameter of the maximum-size aggregate in the concrete. A third paper by Mr. Tucker indicates that stresses much beyond those ordinarily considered as the strength of the material may be present in a portion of the specimen under test. He demonstrates by the statistical theory of strength that the modulus of rupture as usually calculated should be much greater than the tensile strength. It is also shown that in a concrete cylinder tested in compression with ends restrained, the tensile stresses are too small to cause failure in tension.

Interesting data on the *Effect of Type of Test Specimen on Apparent Compressive Strength of Concrete* are given in a paper by Bryant Mather, Engineer, Central Concrete Laboratory, Corps of Engineers, U. S. Army. Two series of comparisons are presented involving a total of 2,375 strength tests. The first series compares drilled cores and modified cubes, all specimens being capped with sulphur compounds and all test results being corrected to length-diameter or height-width ratio of two (Section 7 of A.S.T.M. Method C 42). The author has not drawn any conclusions regarding the comparable strengths, which seems quite erratic even when considered within a given core-strength range or cube-strength

range. Series Two compares laboratory specimens consisting of 6- by 12-inch cylinders and molded 6-inch square blocks. The blocks varied in length: 6¼, 8, 10 and 12 inches, but were all tested as modified cubes (A.S.T.M. C 116-44). The use of correction factors in interpreting the modified cube test is recommended, but no values are given in this paper. The author presents the data with the expressed thought that they may provoke further study with a practical objective.

Triaxial Compression Triaxial tests of jacketed and unjacketed specimens of saturated concrete and rock are reported by Dr. Karl Terzaghi, Consulting Engineer and Lecturer on Engineering Geology, Graduate School of Engineering, Harvard University. The application of his analysis is primarily concerned with the hydrostatic uplift in rock or concrete at the base of storage dams, and he concludes that within a depth of about 100 feet the hydrostatic uplift is almost fully active but at a depth of 20,000 feet it may have become negligible, but not necessarily so. He suggests the use of a triaxial load testing arrangement as a means for determining the effect of the porewater pressure on the strength of certain types of rocks located at depths beyond 100 feet.

Soundness of Concrete and Aggregates *Automatic Accelerated Freezing and Thawing Apparatus for Concrete* is described in detail by C. E. Wuerpel and H. K. Cook, Engineer in Charge and Engineer, respectively, Central Concrete Laboratory, Corps of Engineers, U. S. Army. A complete cycle between 0 F. and 42 degrees F. is obtained in 2 hours with a full load of 102 concrete specimens 3½ by 4½ by 16 inches. Typical results are given to illustrate the practicability of the apparatus for acceptance tests based on freezing and thawing. Control specimens not subjected to freezing are used to rate the resistance of the concrete to repeated freezing and thawing. The dynamic modulus of elasticity and flexural strength are accessory tests in evaluating the durability of the concrete. Although the cost of the apparatus is about $10,000, the authors feel that the value of the information obtained is at least as great as could be obtained by strength tests with a compression testing machine of equal cost.

A comparison of *Absorption and Soundness of Maine Sands* is the subject of a paper by Andrew Adams and H. A. Pratt, University of Maine, in which they show that the result of the magnesium sulphate test may be estimated closely from the result of the absorption test. Standard A.S.T.M. procedures were followed on 62 sands well distributed over the state. It was further concluded that the weighted soundness loss may be predicted from the loss on the 14-mesh sieve alone. The combination of these two findings would facilitate control tests of sand to a very useful extent.

Refractories A number of new tentatives have been adopted as the result of work of Committee C-8 on Refractories under the guidance of Chairman J. D. Sullivan, Battelle Memorial Institute. These include tests for bonding strength and refractoriness of air-setting refractory mortars and tests for thermal conductivity of refractories, insulating fire brick, and fireclay refractories, as well as specifications for air-setting refractory mortars. The committee is recommending the adoption as standard of the panel test for resistance to thermal and structural spalling of fireclay plastic refractories and the test for workability index of fireclay plastic refractories. Tentative revisions applying to the standard methods of panel test for resistance to thermal and structural spalling of refractory brick, high-heat duty fireclay brick, and super-duty fireclay brick are also recommended for adoption as standard.

New Officers The new officers of the society, who were installed just prior to adjournment of the annual meeting, include as president, J. R. Townsend, Materials Engineer, Bell Telephone Laboratories, Inc., New York; vice-president, T. A. Boyd, Head, Fuel Department, Research Laboratories Division, General Motors Corporation, Detroit; and the following five members of the Executive Committee: John R. Freeman, Jr., Technical Manager, American Brass Company, Waterbury, Connecticut; L. J. Markwardt, Assistant Director, U. S. Forest Products Laboratory, Madison, Wisconsin; Carlton H. Rose, Chemist, National Lead Company Research Laboratories, Brooklyn, New York; L. P. Spalding, Chief Research Engineer, North American Aviation, Inc., Inglewood, California; and William A. Zinzow, Chief Physicist, Bakelite Corporation, Bloomfield, N. J.

New Diatomite Company Organized at Baker, Ore.

Organization of the Baker Diatomite Company at Baker, Oregon, gave the community a new industry of vital importance to the war industry. The diatomite (known also as infusorial earth and tripolite) will be removed from a valuable deposit 20 miles north of Baker and crushed before it is shipped. It is a white, chalklike material composed chiefly of silica and water. Since it is a poor heat conductor, diatomite is used for steam pipe and boiler covering and for building insulation. The deposit is the best developed in this area.

Asphalt Landing Mat Put to Use in Invasions

A sturdy asphalt landing mat, made of a new material called P.B.S., has been laid successfully on more than 100 landing strips overseas since D-Day for the use of Allied forces. Although the mat first was developed by British and Canadian engineers, P.B.S. in its present form is largely the result of the work of the United States Waterways Experiment Station at Vicksburg, Mississippi. The ¼-inch thick surfacing lends itself easily to repairs. Made of burlap and impregnated with asphalt, it resembles a roofing material in appearance.

Sand and Gravel Data Published for Canada

The mining, metallurgical and chemical branch of Canada's Department of Trade and Commerce announced that the commercial production of sand and gravel in the Dominion during 1943 was 25,744,469 short tons, valued at $9,005,857. Quebec and Ontario, Canada's largest sand-and-gravel producing area, together had a tonnage of 18,886,685. There were 1,387 firms engaged in the Canadian sand-and-gravel industry.

Governor Ben T. Laney of Arkansas has announced the appointment of Harold B. Foxhall as state geologist, to succeed J. W. Kimzey.

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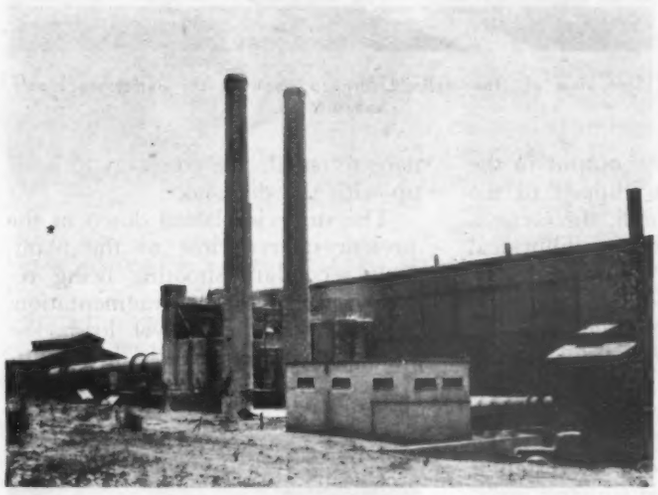
Personnel and Installations Of Three Modern Mexican Plants

This construction view shows the coolers, kiln foundations and silos at the plant of Cementos Portland del Bajio, S. A., Leon, Guanajuato.

WHEN the July issue of PIT AND QUARRY went to press, some of the photographs for the article on the cement industry in Mexico had not yet arrived, presumably due to censorship delays at the border. As some of these pictures show some of the men prominently identified with several of the plants described in that article and others are views of new plants or other plants about which little or nothing has been published, these photos are presented here as a supplement.

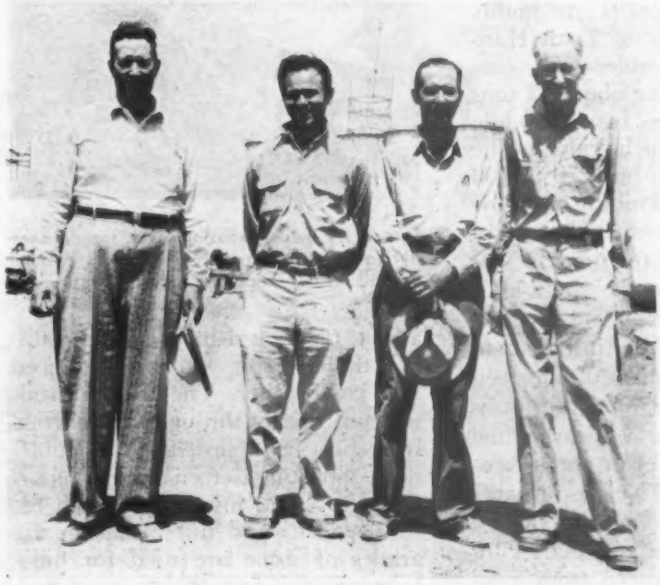
Later information has also been received on the proposed new plant to be built in Yucatan. It is now reported that a possible site for this plant has been selected near Campeche, where more suitable materials are available than at the site formerly proposed near Merida. Be-

(*Continued on page* 89)

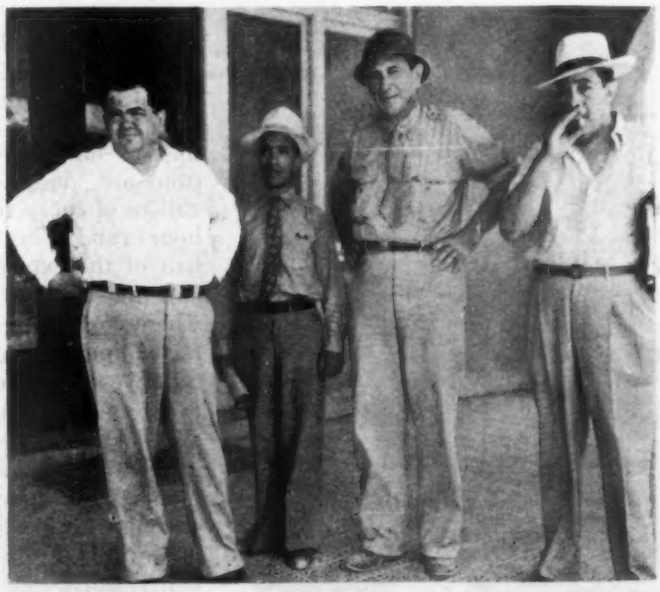


General view of the plant of Impulsora de Cementos, S. A., at La Junta, Jalisco, showing the kilns, coolers and storage building. This is the former Cementos Guadalajara plant.

At the plant office of Impulsora de Cementos, S. A., are, left to right: J. Morel, chief accountant; P. M. Williams, manager; G. P. Horn, superintendent; L. E. Hetrick, chief chemist.

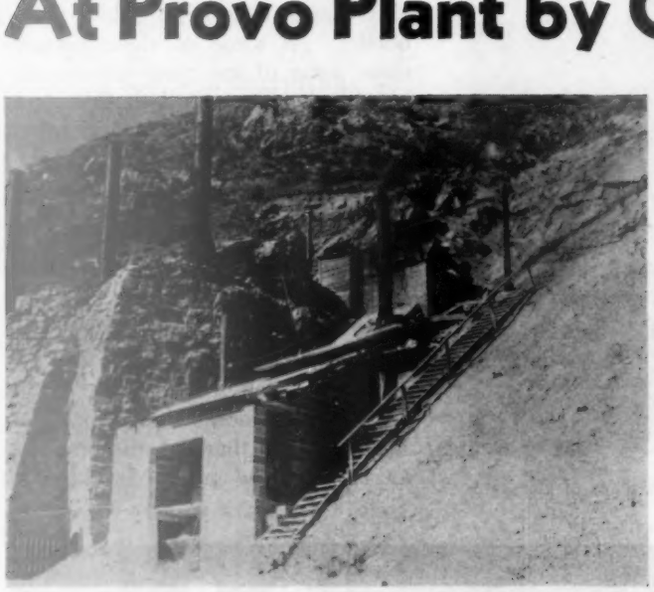


Standing on the site of the plant of Cementos Portland del Bajio, S. A., at Leon, Guanajuato, are, left to right: J. B. Harris, superintendent of erection; Cecil Ring, assistant to Mr. Harris; L. Z. Abramson, former resident engineer; John Byron, construction superintendent.



Before the office of Cementos Mexicanos, S. A., Monterrey, Nuevo Leon, are, left to right: Juan Yunes, chief chemist; Juan Amaya, secretary to Mr. Seelig; John C. Seelig, general superintendent; Alberto Guevara, inspector, Commissione Nacionale de Irrigacione.

Production Boosted, Costs Reduced At Provo Plant by Oil-Burning Furnace



Completed furnace installation at the Provo Lime Company, Provo, Utah. Concrete-block building encloses lower end.

Side view of the inclined furnace, showing the outlet stack and exhaust fan.

WHEN the Mormons settled in Utah, one of their first discoveries was a huge deposit of high-calcium limestone near what is now the city of Provo. Crude kilns were soon erected to calcine the stone into lime, and the deposit has been worked almost continuously ever since to supply the state's growing demand.

The Provo Lime Company has been operating on the site for the past several years. Three old-type shaft kilns have been used to calcine the stone, coke now being employed as fuel. Much of the output in the war years has been shipped to the West's newest steel mill, the Geneva Steel Company, for metallurgical use. The old kiln equipment has, of course, proved quite inefficient. Fuel costs have been high and the quality of the lime produced has, at times, been generally unsatisfactory. In seeking a more modern method of burning the stone, the owners finally decided to install a Nelson No. 5 inclined furnace, probably the newest and most revolutionary method of producing lime.

View in the quarry, with Mr. Hansen (left) and Mr. Nelson, designer and builder of the new-type furnace.

The first Nelson unit has just been installed and the results are highly gratifying, according to Evan Hansen, general superintendent. The output of lime is running about 12 tons per day from the new furnace, while the oil burners which calcine the stone are consuming but 270 to 300 gallons of cheap fuel oil during a 24-hour run. This cost is less than half of the expense required to calcine the material in the shaft kilns where coke is burned. And, as soon as equipment can be installed to improve the uniformity of the feed to the furnace, the lime output is expected to increase while the fuel ratio will become even more economical. Additional Nelson furnaces will also be installed at the earliest opportunity, and the old shaft kilns will gradually be retired from service. Meanwhile the old burning equipment continues to be operated in conjunction with the inclined furnace to enable the company to keep up with the demand.

The stone is blasted down in the present quarry close to the plant, little secondary shooting being required for desirable fragmentation. A small gasoline shovel loads the four quarry dump trucks which discharge the stone into a feed hopper

Temporary paper housing over the furnace during construction in cold weather. A small oil heater kept the interior warm.

at the plant, a 4-inch grizzly scalping the oversize, which is reduced in a jaw crusher. The crusher product and grizzly throughs are carried by a short belt-conveyor to a double-deck vibrating screen which separates the stone into plus 3-inch, 3- to 1¾-inch, and fines. The coarse grades of stone are used for lime-burning, the fines being marketed, after drying and grinding in a Raymond Impact Pulverizer, for various purposes, the chief of which is

rock-dusting in western coal mines. The pulverized stone is shipped in 100-pound Bemis paper bags. After sizing, the three grades of raw stone are chuted to three storage bins from which front-dump mine cars operating over a system of narrow-gage tracks carry it, as needed, to the new furnace, the old kilns, and to the stone drier-and-pulverizer.

Nelson inclined furnaces, such as the one installed in this plant, are

View of installation showing the new furnace under construction and three old kilns.

a development of the Victor J. Nelson Engineering & Construction Company of Burbank, California. Two earlier installations were made in Mexico—one at Torreon and the other in Durango. Both have proved highly successful as fast, economical units for converting limestone into high-quality burned lime, and the Provo plant is the first in the United States to utilize this method.

To eliminate the need for elevating equipment, the furnace was installed at a 35-degree slope on a hillside, and the firing is done by two steam and oil burners located at the lower, or discharge, end. The heat passes upward through the furnace, preheating and calcining the stone; the waste heat that remains is returned through special chambers, utilizing it to the fullest extent. Air for combustion passes over the hot lime as it is discharged, cooling the lime and at the same time being pre-heated. A system of stoker rods in the furnace keeps the stone flowing uniformly until it reaches the calcination stage. Close control of temperatures is possible with the two oil burners and an additional control is provided in that the flow of stone can be speeded up or slowed down at will through the variable-speed motor which drives the discharger. Little power is required, a 1-horsepower electric motor driving the exhaust fan and a 1-horsepower variable-speed motor operating the discharger. One man only is needed to handle the furnace operations.

Cars carry the lime to a conveyor system which takes it to the 50-ton, 3-compartment loading bin. Gravity screens above the bins take out the fines. These fines are, for the most part, shipped to Salt Lake City where they are used by an affiliated concern, the O. V. Hansen Lime & Stucco Company, in the production of aged lime putty. The lump lime output goes to the Geneva steel plant, being trucked 2½ miles from the plant to a railroad siding where it is loaded by a belt-conveyor into special covered hopper cars.

As the Provo plant is further improved by the addition of more Nelson inclined furnaces, a hydrating plant is also to be installed.

The Provo furnace was installed under the supervision of Victor J. Nelson, head of the company which manufactured it; his brother, Ruben N. Nelson, who designed and developed the special burners used; and A. E. Archey, field superintendent for the Nelson company. The furnaces are not sold outright but are installed on a royalty basis.

The Nelsons have also developed a dry-ice manufacturing plant to utilize and compress the CO_2 re-

Burned lime being discharged from the furnace by automatic discharger into the conveyor chute.

leased in the furnace when the stone is calcined. For practical reasons, recovery is not attempted with fewer than three furnaces CO_2 installed in a plant.

All equipment of the Irving Lanning Lime Company of Bolivar, Missouri, was recently moved to a new quarry site near Oswego, Kansas, where the limestone-crushing machinery was set up.

Personnel *(from page 87)*

hind this venture is a group of Mexican industrialists, executives of the Banco Nacional de Mexico, and the Nacional Financiera, the government lending agency. The cost of the projected plant is estimated at 1,600,000 pesos ($330,000)—600,000 of which ($124,000) will be supplied by the industrialists, an equal amount by the bank, and 400,000 peso ($82,000) by the Government.

The three 6- by 80-foot coolers in the Leon plant. Kiln foundations are in background.

Some of the twenty tube mills which will do the raw-material and clinker grinding in two stages at the Leon plant.

...from ROEBLING

FOUR DIFFERENT FORMED EDGES

Turned Edge

Metal Reinforced Edge

Double Metal Reinforced Edge

Square Bar

WHATEVER THE JOBS that test *your* vibrator or shaker screens—grading, sizing, cleaning or filtering — a made-to-order Roebling screen will do the job.

These tough, durable screens can take hard knocks at top speed . . . from coal, coke, metal or non-metallic substances. And they can be built in *your* choice of mesh size, metal and wire diameter, in turned or metal reinforced edges.

We'll be happy to apply Roebling wire experience to your screening problems. Send us your specifications today.

Woven Wire Fabrics Division
JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
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FROM FINEST FILTER CLOTH TO COARSEST SCREEN!

Dutch Plain Weave

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Rectangular Mesh

Square Mesh

ROEBLING

PACEMAKER IN WIRE PRODUCTS

WIRE ROPE AND STRAND • FITTINGS • SLINGS • SUSPENSION BRIDGES AND CABLES
COLD ROLLED STRIP • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS
AIRCORD, SWAGED TERMINALS AND ASSEMBLIES • AERIAL WIRE ROPE SYSTEMS • ROUND AND SHAPED WIRE • ELECTRICAL WIRES AND CABLES • WIRE CLOTH AND NETTING

PERSONAL MENTION

H. S. Martin

H. S. MARTIN, former general manager of the potash mining operations of the International Minerals & Chemical Corporation, Carlsbad, New Mexico, has been named president of the Southern Phosphate Corporation, with headquarters at Bartow, Florida.

JOHN A. BLANK, well known in the cement industry in the United States as a former general superintendent of the Superior Cement Corporation at Superior, Ohio, and prominent in his connections with other companies, has been spending most of his time in Mexico in recent years. He is acting as consultant for cement plants at Guadalajara, Orizaba and Puebla, some of which are making or planning to make masonry and Portland pozzuolan cements. While at Superior, he and his son, Alton J. Blank, now general manager of Cementos Atoyac, S. A. at Puebla, developed the Blank Process of masonry cement manufacture. For several years thereafter Mr. Blank spent much of his time getting new plants started making this cement.

JOHN O'LAUGHLIN and DAVID F. MCKENZIE have recently won promotions on the staff of the Consumers Company of Chicago. Mr. O'Laughlin, former vice-president of the concern, has been named president, to succeed W. J. Kelley, who had resigned. Mr. McKenzie, formerly in charge of wholesale coal, has been made vice-president in charge of all fuel divisions.

J. DOUGLAS ANDERSON, well known in mining and smelting operations in Utah, has been appointed consulting engineer for the Potash Company of America, Carlsbad, New Mexico.

C. E. Lovewell

C. E. LOVEWELL, formerly service engineer for the Louisville Cement Company of Kentucky, has assumed his new duties as chief engineer and research director with the Carney Company of Minneapolis and Mankato, Minnesota, manufacturers of natural cement and masonry cement since 1883. Mr. Lovewell's headquarters will be at the Carney general sales offices in Minneapolis.

FRED DAWKINS, a surfacing engineer who supervised the construction work on the Pan American World Airways fields in Mexico, Cuba, and some South Amer-

ican countries, has been engaged by the Land Construction Company of St. Joseph, Missouri, as the firm's new superintendent. Mr. Dawkins comes to his new post from the highway department at Jefferson City, where he was engineer of the materials bureau.

MARK E. SNYDER, industrial relations director of the Marblehead Lime Company of Chicago and formerly superintendent of the firm's South Chicago plant, has been named counselor of industrial relations by the National Association of Personnel Directors.

M. E. Snyder

JOHN DUNN and HARRY C. TAYLOR of the Bellefonte plant of the Warner Company have been given promotions, as follows: Mr. Dunn has been named assistant treasurer in charge of accounting and finance; Mr. Taylor has been made purchasing agent.

RAYMOND BROOKS has taken up his duties as manager of the South African Development Company, a new subsidiary of the Freeport Sulphur Company, at Johannesburg. The new company was formed for exploration purposes.

MAX HILLYARD of Parsons, Kansas, has announced that he recently purchased a rock-crushing plant from the D. E. Minton Construction & Manufacturing Company of that city. Mr. Hillyard will manufacture limestone products for local distribution.

JULIUS B. CHRISTMAN, for the last 15 years president of the South Bend Sand & Gravel Corporation, South Bend, Indiana, has resigned his office and disposed of his interests to his associates, Frank R. Morrow and D. C. Hay.

CARL W. MCELHENY was appointed superintendent of the South Chicago plant of the Marblehead Lime Company of Chicago on July 1. Mr. McElheny had formerly been superintendent at the France Stone Company's South Chicago plant.

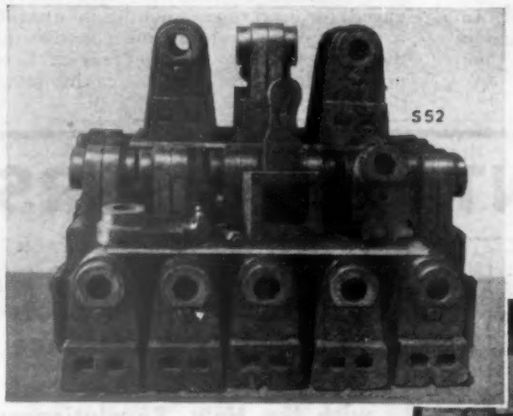
C. McElheny

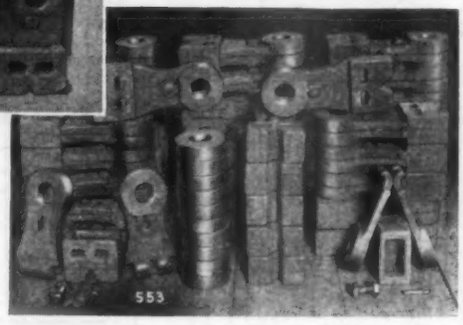
KENNEDY E. ELLSWORTH, district manager of the United States Line Products Company of Los Angeles and director of the Arrowhead Lime & Chemical Company, has been appointed to direct the combined operations of these firms.

DEWEY FULLINGTON, a field representative of the Portland Cement Company, has been promoted to assistant sales manager in the Kansas City office.

Regardless of Design, a Manganese Steel Pulverizer Hammer Usually Wins Out

Nobody recognizes better than we do how important design can be in enabling a manganese steel device or wearing part to show its best economy. But in *any* workable design manganese steel almost always beats the field. A recent example:





S-52 - S-53. Two recent shipments of Amsco-Clark hammers showing features of design.

In 1944 a Chicago district steel company bought a new hammer crusher equipped with "alloy steel" two-part hammers for pulverizing coal. The "alloy steel" was apparently selected by the crusher manufacturer on the theory that manganese steel in milling such a friable substance as coal would not get sufficient work-hardening to develop good wearing life. Several sets of the "alloy steel" hammer tips were used before the first set of manganese steel hammer tips was installed, and these "alloy steel" tips produced an average of 72,000 tons of pulverized coal. The first set of Amsco manganese steel tips produced 160,240 tons and the second set 183,490 tons.

Given "The Toughest Steel Known" for resistance to shocks and abrasion, a hammer can be designed to afford the greatest convenience and economy in other directions. The Amsco-Clark renewable-reversible tip hammer (patent pending) shown in S-52 and S-53 has all of these features, besides the advantages of the toughness and work-hardening property of manganese steel:

Great saving in discarded metal.— 75% of tip metal is actually used.

Time consumed in reversing or replacing tips is negligible.

There is no operating stress on the shank bolt.

Tip cannot loosen or drop off so long as the two-part shank is on the rotor pin.

No guessing when to change tips — "windows" show when shank is about to be attacked.

Same size tip can be used with longer or shorter shanks as necessary in different makes of hammer mills.

The make and model of your machine and pattern number on your present hammers will enable us to quote prices.

How Amsco Conservation Welding Products salvage worn crusher parts told in Bulletin 941-W

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN Brake Shoe COMPANY

COLONEL JAMES BOYD of Denver, Colorado, War Department adviser on War Production Board materials, has been appointed head of the Allied Control Council branch supervising industrial production in that area of Germany assigned to the United States administration.

KENNETH W. HUFFINE, former manager of the Johns-Manville Products Corporation of Waukegan, Illinois, has been named vice-president of the company's new engineering department, with offices in New York. Mr. Huffine will be succeeded in his former post by C. R. Wikel, his assistant.

JOHN H. LAUER of Williamsport, Indiana, has been appointed chairman of the new Indiana State Highway Commission by Governor Ralph Gates.

HARRY JOMINI has been named senior plant engineer at the Wakefield magnesium plant of the Aluminum Company of Canada.

THOMAS J. THORNE is now general foreman of the Oro Grande plant of the Riverside Cement Company.

ALBERT FELMET, personnel director of the National Gypsum Company, Buffalo, has been elected a director of the Buffalo chapter of the National Office Management Association.

MYRON A. SWAYZE of Hudson, New York, director of research of the Lone Star Cement Corporation, will be engaged for next three months in making a survey of the cement and concrete industry in Germany for the Foreign Economic Administration. During his leave of absence from his work at Lone Star, Mr. Swayze will travel by air to England.

ALVIN M. CUMMINGS has been named a director of the International Talc Company. Mr. Cummings is general manager of the firm.

NATHAN K. KARCHMER has been appointed plant manager of the South River Sand Company, Old Bridge, New Jersey. Mr. Karchmer was formerly technical assistant to the general superintendent of the Solvay Process Company.

LESLIE S. TAYLOR has been appointed mill superintendent by the Ancor Corporation at St. George, South Carolina. Mr. Taylor was formerly with the National Lead Company.

O. H. WUSTRACK, formerly a design engineer with the Pfaudler Company, Rochester, New York, has been named associate editor of *Rock Products*, a journal covering the field of nonmetallic mining.

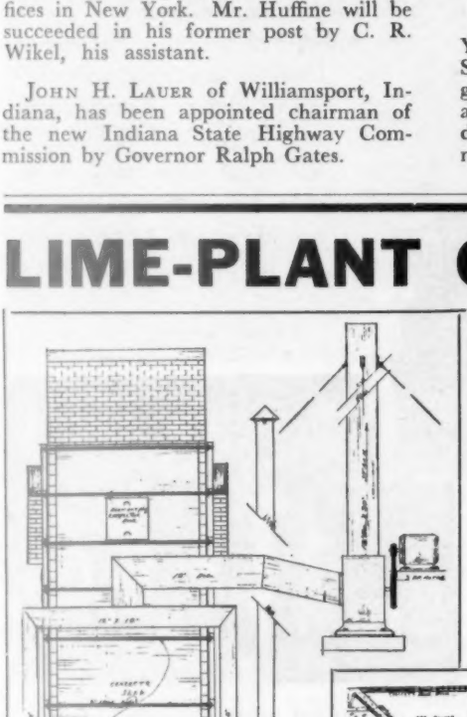
LIME-PLANT OPERATORS

get

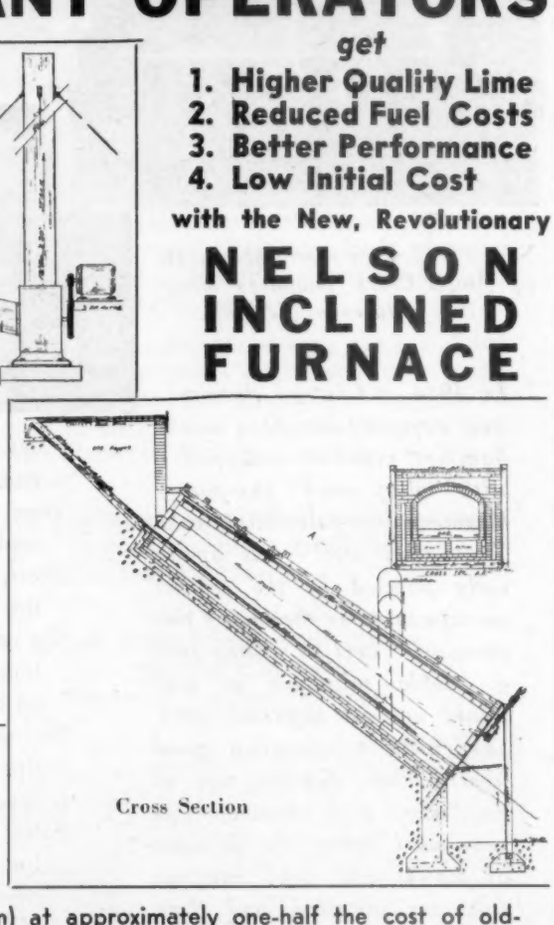
1. Higher Quality Lime
2. Reduced Fuel Costs
3. Better Performance
4. Low Initial Cost

with the New, Revolutionary

NELSON INCLINED FURNACE



Front View



Cross Section

Only the Nelson Inclined Furnace provides controlled feed of stone, plus controlled heat. Calcines lime (or gypsum) at approximately one-half the cost of old-fashioned vertical or rotary kilns. Upkeep expense extremely low due to elimination of moving parts. Fired by low-cost fuel oil (or gas), the Nelson Inclined Furnace comes completely equipped with automatic discharger, steam atomizer, suction fan, motor and oil tank. Each unit will produce up to 15 tons of finest quality lime per day at a fuel cost of about 75 cents per ton of lime produced! Any number of units may be installed to suit your requirements.

Get the facts TODAY . . . Make us prove that Nelson Inclined Furnaces can eliminate your lime or gypsum production worries for all time!

Designed, Built and Patented by:

VICTOR J. NELSON ENGINEERING & CONSTRUCTION COMPANY
1321 Riverside Drive — Burbank, Calif.

OBITUARY

ALLAN V. RITCHIE, 59, for 14 years superintendent of the research laboratories of the Texas Company at Beacon, New York, died June 19 of a heart attack in the company's New York City offices. Mr. Ritchie, who had been with the Texas Company since 1923, was to have received on June 25 an award from the Office of Scientific Research and Development in recognition of his war research work.

CHARLES F. JACKSON, of Mamaroneck, New York, who organized and supervised the government's investigation project for strategic metals, died recently in Toronto, Canada. Mr. Jackson was chief engineer of the mining division of the United States Bureau of Mines from 1936 to 1942.

HERBERT W. FEATHER, assistant secretary-treasurer of the Carbon Limestone Company and secretary-treasurer of the Carbon Concrete Brick Company of Youngstown, Ohio, died at his home, June 25. Mr. Feather had been with the Carbon Limestone Company for 30 years.

HARRY F. SPIER, president of the New Jersey Pulverizing Company, New York City, died on July 8. Mr. Spier was a charter member of the National Industrial Sand Association and a member of its board of directors.

LEO BROWN, 45, manager of the Illinois Silica Sand Company plant near Ottawa, died in that city recently. He had been plant manager since 1935.

GEORGE T. SEABURY, 65, secretary of the American Society of Civil Engineers, died May 25. Mr. Seabury had served in this office since 1925.

Legal Decisions

By LEO T. PARKER

●

Gravel Lease Held Invalid

Irrespective of who sells sand, gravel, or other non-metallic products, only the true owner of the land from which such products are mined, or the one who holds a lease from the true owner, may make a valid sale contract.

For illustration, in Edmiston v. Whitney Land Company, 32 S. E. (2d) 259, reported December, 1944, a person named Ed sued a county for $461 for sand and gravel the county had taken from land on which he claimed that he had a lease for an "exclusive right of user of the strip of land . . . together with all water and sand rights incident to said land."

During the trial a company proved that it owned three-fifths of the land and that the person who had leased it to Ed owned two-fifths. This court held that Ed was not entitled to a judgment for payment from the county for the sand and gravel removed from the land.

Employee Does Farm Work

Farm workers are not entitled to unemployment compensation, because state compensation laws do include this type of worker. However, the fact that an employee casually performed farm work will not prevent him from receiving unemployment compensation.

For illustration, in Cape Girardeau Sand Company v. Unemployment Compensation Commission, 184 S. W. (2d) 605, reported February, 1945, it was shown that an employee of a sand company performed some farm labor for the employer, who did not report to the Unemployment Compensation Commission as to his earnings when doing the farm work.

Later the employee applied for unemployment compensation insurance when he lost his job.

The higher court allowed the application notwithstanding the fact that the employer failed to report the farm earnings. This court said:

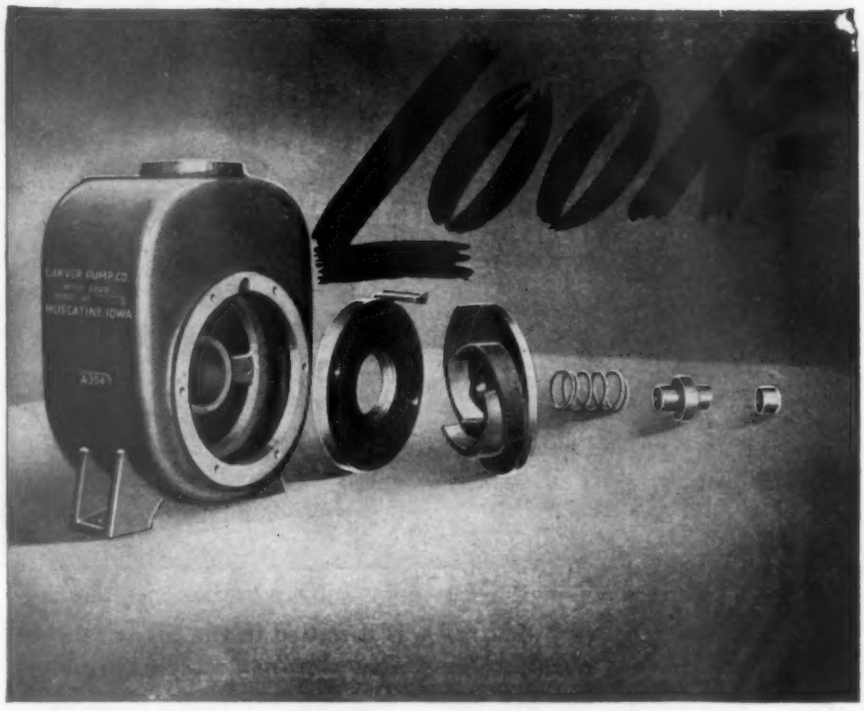
"It appears that claimant performed some farm labor for the appellant and such labor is exempt from our unemployment compensation law. However, it appears that the reports to the Commission as to claimant's earnings did not include farm labor."

Taxpayers Suit

Considerable discussion has arisen from time to time over the legal question: When is a taxpayer liable for expenses and costs of a state, county or city.

For illustration, in Dickinson v. Hot Mixed Bituminous Industry of Ohio, 58 N. E. (2d) 78, it was shown that a taxpayer sued the Hot Mixed Bituminous Industry of Ohio to recover for the state certain money from road contractors on account of alleged conspiracy of the contractors and state highway officials which this taxpayer claimed resulted in stifling competition and therefore increasing the price to the state.

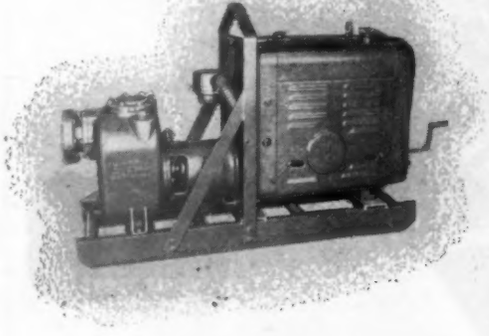
One important question decided by the court was that a taxpayer not actively participating in the litigation could not be held liable for expenses and costs



...how simple they are!

There are fewer parts in Carver pumps because every part does its job right. No gadgets have to be added to step up efficiency or correct faults. Impellers are scientifically designed with web-reinforced vanes confining wear to but one side. Renewable liners carry a cast lug protecting the scroll casing at the impeller cut-off where wear is greatest. The wearing surface seal rings of the Carver Lifetime Seal are made of Tungsten Carbide—a material so hard it cuts glass like a diamond.

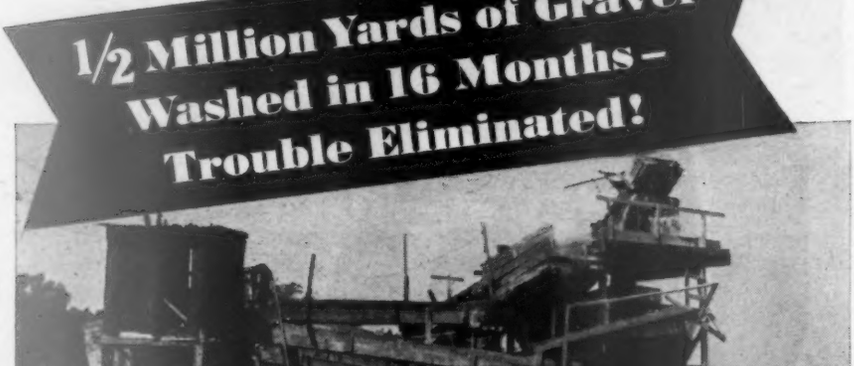
Every Carver Pump carries a "Certified" tag which means that it has been carefully tested and fully meets our high standards for performance on the job. Write for details or see your local distributor.



THE CARVER PUMP CO.
Muscatine, Iowa

CARVER CENTRIFUGAL Certified PUMPS

1/2 Million Yards of Gravel Washed in 16 Months – Trouble Eliminated!



The Eagle Log Washer pictured was installed in the plant (shown above) of N. C. Carroll & Sons, Pratt, Kans., which furnished gravel for a large bomber base.

A report 16 months later showed that 500,000 yards of gravel had been washed, working 24 hours a day. *Mud ball trouble encountered prior to installation of the Eagle Log Washer has been totally eliminated.*

In plants large and small Eagle Washers are establishing noteworthy production records and processing materials to the most exacting specifications.

Send for Catalog No. 44 for full information on Eagle Log Washers, Screw Washers, Shale Removers, Classifiers, Dehydrators and Special Sand and Gravel Plant Equipment.

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133 Holcomb Avenue
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Let an Eagle "feather your nest!"

EAGLE *Specialized Sand and Gravel Equipment.*
"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
CLASSIFIERS — REVOLVING SCREENS
EAGLE IRON WORKS
DES MOINES, IOWA
"SERVING INDUSTRY FOR OVER SEVENTY YEARS"

in the suit, even though such taxpayer would be greatly benefited.

However, this court held that taxpayers actively participating in the suit are liable.

Personal Liability of Corporation Official

Modern courts have laid down a legal rule, as follows: The executive officers who induce a corporation to do wrongs or illegal acts incur individual and personal liability. In other words, an officer of a corporation who takes part in the commission of an illegal act by the corporation is personally liable.

For illustration, in Pennington Trap Rock Company v. Pennington Quarry Company, 38 Atl. (2d) 869, reported October, 1944, it was shown that the Pennington Trap Rock Company leased to the Pennington Quarry Company a quarry and the structures, tools and equipment thereon.

After expiration of the lease the Pennington Trap Rock Company sued a man named Gilbert who was the sole owner of all the capital stock of the Pennington Quarry Company and the one in sole and absolute control of the corporation. In the suit the counsel for Pennington Trap Rock Company contended that Gilbert, through the corporation, had failed to keep and maintain the buildings, plants, improvements, fixtures, furniture, machinery and equipment in good order and repair, and that he had failed to work the premises according to the rules and customs pertaining to stone quarries and with due regard to the preservation of the premises as a workable quarry.

Gilbert argued that he could not be held personally liable because he acted for the Pennington Quarry Company. However, this higher court said:

"The existence of a corporation should never be allowed to shield an individual who is in control of that legal fiction from the consequences of tortious acts maliciously ordered or directed by him to be done and perpetrated through that instrumentality."

Also, see Luke v. Du Pree, 158 Ga. 590, 124 S. E. 13, where the higher court held a corporation official liable where he induced another to break his contract.

Higher Court Upholds Freight Reductions

In a majority of freight reduction rate litigations the courts hold that different rate reductions should be on percentage basis. However, any other reasonable basis for reducing freight rates may be valid.

See Southwest Stone Company v. Railroad Commission, 173 S. W. (2d) 325. It was shown that the Southwest Stone Company sued the Railroad Commission to set aside its order fixing the carload freight rates on crushed limestone. The stone company alleged that the old rates were $1.17 and $1.60, respectively, per ton, and that a 45-cent reduction of both rates by the Railroad Commission, rather than a reduction on a percentage basis, was unreasonable and discriminatory. However the higher court upheld validity of the new rates and said that no discrimination was proved.

Validity of Exclusive Agency

Making a contract of sale without a definite duration is void.

For illustration, in International Company v. Lacy, 53 N. E. (2d) 636, it

was shown that a manufacturer's representative verbally promised an exclusive agency to a purchaser and to reduce it to writing, which never was done.

The higher court held that no valid exclusive agency contract existed, and said:

"It (manufacturer) did not agree to continue exclusive representation once commenced for any certain time, nor under any certain conditions. It could hardly have been within the contemplation of the parties that appellee (buyer) should have the exclusive right to retail appellant's (manufacturer's) merchandise forever."

Law of Fixtures

Few readers realize the importance of being able to distinguish between ordinary chattels and legal fixtures.

For example, in Arco Company v. Hawthorne Company, 38 Atl. (2d) 290, reported August, 1944, it was shown that a building was specifically constructed for the purposes of producing materials. A considerable quantity of manufacturing equipment as pumps, engines, condensers, and the like were installed in the building. The owner of the building and land on which it was situated gave a mortgage thereon. Later it was contended that the various manufacturing equipment was not a part of the real estate and, therefore, the mortgage on the real estate should not include the equipment. However, the higher court held that the real estate mortgage covered and included the land, building and all manufacturing equipment.

Contract Not Accepted

Modern higher courts consistently hold that no contract is valid unless the "minds" of both parties meet. Therefore, an offer must be *unconditionally* accepted, otherwise a valid contract is not completed and neither party is liable in damages for failure to comply with the terms of the alleged contract.

For instance, in Kerr Corporation v. Elizabeth Sales Corporation, 141 Pac. (2d) 938, it was shown that a company, which owned real property, made a written contract to lease it. The written lease contained a clause which provided that the leasee would construct a building on the lot. The contract stated that the plans and specifications "shall be prepared by the leasor (corporation) within a reasonable period of time, and shall be approved in writing by both the leasor and the leasee before the commencement of the construction of said building."

The corporation prepared the final plans and specifications, but the leasee failed and refused to approve the same, and the building was not erected.

The corporation sued the leasee for damages. However, since the lease contract did not provide that the leasee *must* approve the plans, and the latter did not approve them, the higher court held that no valid contract was completed. Therefore, the leasee was held not liable. The higher court said:

"After careful reading and consideration of the writing here in question, it is apparent that approval of the final plans and specifications was an essential prerequisite to a binding contract between the parties."

Salesman Draws Money

Modern higher courts hold that if an employer advances money on commissions *to be* earned by a salesman, the employer cannot compel the salesman to repay the advancements although his earned commissions are less than the amounts advanced to the salesman.

For example, in Western Company v. Tuchin, 55 N. E. (2d) 113, reported June, 1944, it was shown that a salesman agreed to work on a commission basis. The employer agreed to advance the salesman $25 per week. In subsequent months the salesman accepted the weekly advancements, realizing that he had not earned them. At the end of several months the salesman become engaged in another occupation and the employer sued the salesman to recover the difference between the amount paid the salesman at the rate of $25 per week and the actual amount earned by the salesman on the agreed commission basis.

The salesman based his case upon numerous and leading higher court decisions to the effect that "advancements" by an employer to a salesman cannot be recovered although the salesman did not sell sufficient merchandise to equal the amount advanced by the employer.

The jury decided that when the employer paid the salesman $25 per week that this amount was a salary during the weeks the salesman's earned commissions did not exceed this amount. The higher court upheld the jury's verdict which held the salesman not liable for payment to his past employer the money payments in excess of commissions.

Seller Avoid Warranty

Considerable controversy has existed from time to time over the true legal effectiveness of an "as is" guarantee of machinery or merchandise. According to a modern higher court, "as is" in a contract is equivalent to a full and complete statement that no guarantee is given by the seller. In fact an "as is"

See this "N-H"

DOUBLE IMPELLER CRUSHER

Operates on a New Basic Principle

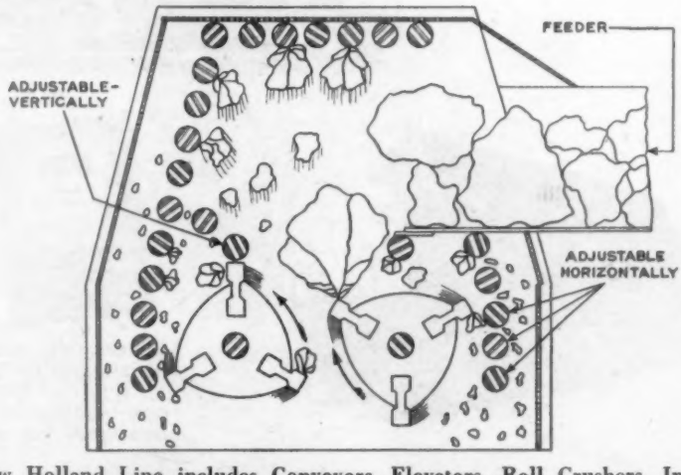
Model 3030 operating in limestone quarry owned by D. M. Stoltzfurs & Sons Co., Quarryville, Pa.

Reduces run-of-the-quarry material as large as thirty inches to an optional minimum of eighty percent under one inch in one operation.

Handles 100 to 150 tons per hour with as little as 100 horsepower.

Combines expensive primary and secondary machinery in one operation.

For portable or stationary units.



New Holland Line includes Conveyors, Elevators, Roll Crushers, Impact type Hammer Crushers, Limestone Pulverizers, Revolving Screens, Vibrating Screens.

NEW HOLLAND MACHINE CO.
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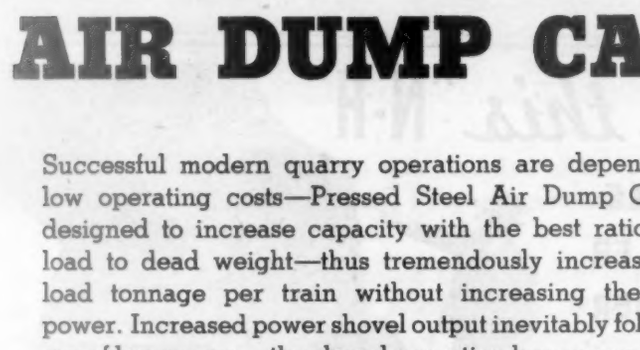
Steelcar

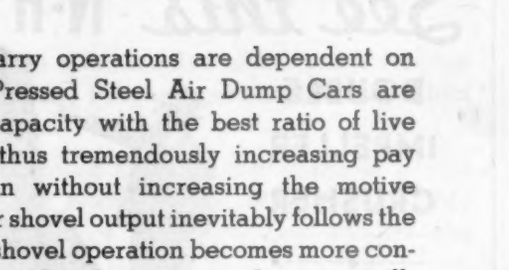
Rolling Trunnion Automatic

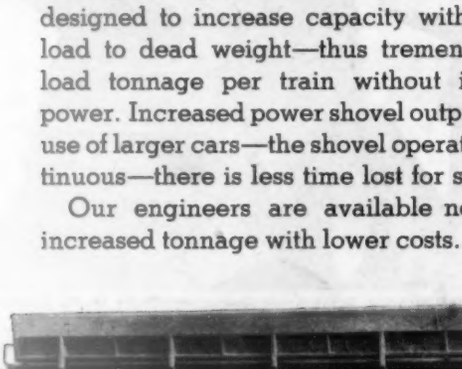
AIR DUMP CARS

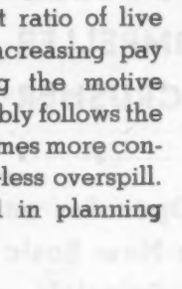
Successful modern quarry operations are dependent on low operating costs—Pressed Steel Air Dump Cars are designed to increase capacity with the best ratio of live load to dead weight—thus tremendously increasing pay load tonnage per train without increasing the motive power. Increased power shovel output inevitably follows the use of larger cars—the shovel operation becomes more continuous—there is less time lost for spotting—less overspill.

Our engineers are available now to aid in planning increased tonnage with lower costs.









Descriptive, technical bulletins on all types of haulage equipment—available on request.

PRESSED STEEL CAR COMPANY, INC.
INDUSTRIAL DIVISION
PITTSBURGH, PA.

clause in a contract of sale cancels and invalidates an implied guarantee which otherwise may be equally effective as a broad expressed guarantee.

For illustration, in Johnson v. Waisman Bros., 36 Atl. (2d) 634, the testimony disclosed facts as follows: A junk or scrap metal dealer purchased an old steam shovel for $25. The dealer soon afterward sold it to a purchaser for $225. The purchaser paid $25 down and agreed to pay the balance of $200 when he came to get the shovel. The written contract between the scrap metal dealer and the purchaser contained a clause which provided that the shovel was being sold "as is." Later the purchaser of the shovel entered into a contract with a company to do certain excavation work for sand and gravel. When he offered to pay the balance due of $200 to the scrap metal dealer, the latter refused to accept it and turn over the steam shovel. The purchaser sued the dealer for damages based upon the profits he would have earned on the job had the scrap metal dealer completed the contract and delivered the shovel to him. The higher court refused to hold the dealer liable, and said:

"The plaintiff (purchaser) was not entitled to assume that the shovel would do the work in question. The seller sold it 'as is' and this term, when contained in a memorandum of purchase and sale, means that the seller sells and the purchaser buys the specific chattel in its then existing physical and mechanical condition and without warranty as to quality or fitness for a particular purpose."

Quite apparently the purchaser based his suit upon improper legal basis. The fact that the "as is" clause invalidated the implied warranty resulted in the seller avoiding liability either for failure of the machinery to operate with reasonable efficiency, and for alleged loss of profits based upon inefficiency of the machinery or breach of the seller to deliver the machinery in accordance with the terms of the contract.

However, the purchaser could have won this suit had he sued and asked the court to compel the seller to deliver the machinery upon payment of the $200 balance due. In other words, a seller may be compelled to fulfill the exact terms of a contract of sale, although he cannot be held liable on a guarantee or for financial losses sustained by the seller based upon failure to the seller to deliver the merchandise, or upon inefficiency of the delivered merchandise.

Questions and Answers

[Mr. Parker will be glad to answer questions regarding legal problems of PIT AND QUARRY readers Questions should be addressed to Leo T. Parker, Legal Editor, PIT AND QUARRY.—Ed.]

LEGAL EDITOR: We operate a bus line from our plant to railway station to save time for our employees to get to their work. A few weeks ago one of the employees slipped on ice on a step and was injured. He wants damages. What do you advise, whether stand suit or pay him a compromise settlement? Big-Stone Company.

Answer: Your company always is liable in damages for an injury sustained by a passenger, if the testimony proves that the injury resulted from negligence of your bus driver.

The law is well settled that your

bus employees are required to use the highest degree of care and caution consistent with the practical operation of the motor coaches to avoid injuries to passengers. See Cannon, 24 Atl. (2d) 325, where a driver started bus with a jerk.

Also, in Dunne v. Connecticut, 195 Atl. 183, it was shown that a passenger sustained severe injuries when he fell because of slipping on ice on the step of a bus. He sued the company for damages and proved that there was a heavy layer of ice on the step.

The counsel for the company argued that the latter was not liable because there was no evidence that the icy condition on the step had existed for such a length of time that the company's driver should have discovered the dangerous conditions.

It is important to know that the higher court held that the bus driver was *obligated* to *inspect* the bus steps at frequent intervals, and that his *failure* to clear the ice off the step was negligence. The court held the company liable.

Also, see Connelly v. Company, 107 Conn. 236. Here a higher court held a passenger entitled to damages who fell as a result of ice on the step of a bus. Under the facts of this case the company was held liable because *of the failure* of its driver to *sand* or *salt* the step.

So, therefore, unless you can prove that your driver frequently inspected the steps, you had best compromise this case.

Legal Editor: When will a court hold one liable for infringing a copyright? In other words, suppose two persons write descriptive or advertising matter almost the same, how can one determine whether he may be liable for infringement?—B. & M.

Answer: While a copyright is intended to protect the author or originator of the thing copyrighted, he must adhere to the law to obtain this protection. Otherwise he can not obtain damages for the infringement. Infringement of a copyright must be connected with the actual copying of the copyrighted work. If, for example, two persons write exactly the same advertising or descriptive circular independently of each other, neither is liable for infringement of the copyright owned by the other.

This law may seem to be unfair and unreasonable, however, copyright laws are intended to prevent copying and do not curtail originality, although exactly the same subject matter is involved. Obviously, however, any person may be liable for copying another person's copyrighted work from memory, the same as if the copyrighted work, booklet, or the like were directly copied. Therefore, in many suits the important testimony is: Did the person accused of infringement see the copyright work or words? If so, he had an opportunity to copy and the court may hold him liable. Basically the important consideration when deciding whether a copyright is valid is: Was the subject of the copyright originated by the copyright applicant and did he first publish it with the proper and legal notification before he applied for the copyright?

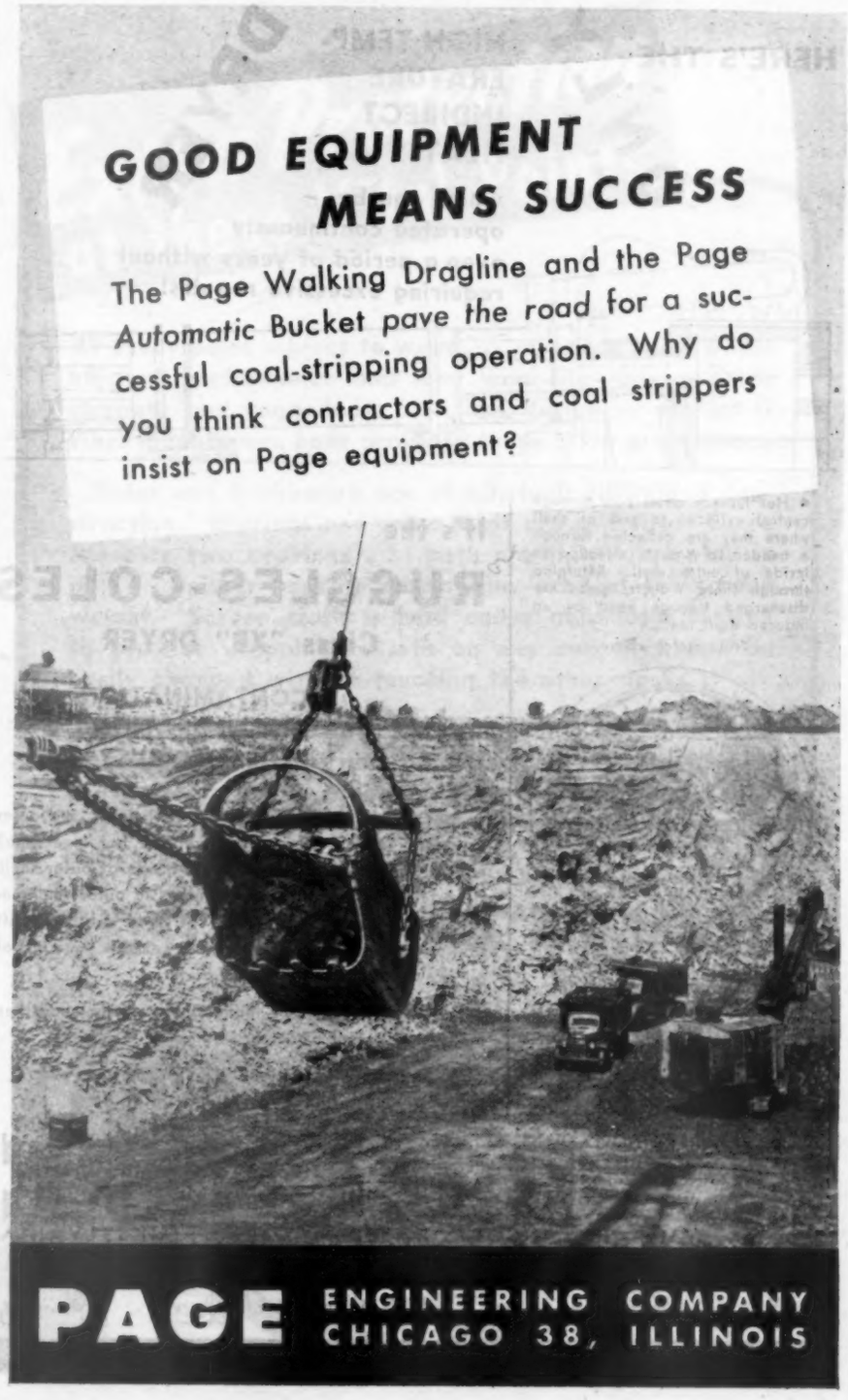
Legal Editor: Recently we made a contract to purchase merchandise from a salesman who made certain false statements. If he had not made these false statements we would not have signed the contract. However, the contract contains a clause that the company is not liable for statements made by its salesman. What are our legal rights and can we refuse to pay for this merchandise? —A. C.

Answer: Irrespective of clauses in contracts intended by the seller to avoid liability for fraudulent statements made by salesmen, the seller remains accountable for legal fraud and deceit. But while you as a purchaser may recover damages from the seller on the ground of fraud, you can not keep the merchandise and avoid payment. For illustration, in *Southwestern Inc. v. Cincinnati,* 139 Fed. Rep. (2d) 201, it was shown that a salesman made a definite and positive verbal guarantee regarding machinery. Later the salesman and the purchaser signed a written contract which contained a clause providing that it was understood that all previous verbal guarantees were canceled and not effective. This court said:

"Fraud in procuring the contract is not available here to nullify its terms."

In order for a purchaser to maintain a suit against a seller for fraud and deceit, it is necessary to allege and prove: (1) that the representations were of material facts which were untrue at the time made, and were known to be untrue by the seller; (2) that they were made with the intent and design of deceiving the purchaser and to induce him to enter into the contract; (3) that the purchaser relied upon such representations and was induced thereby to sign the contract; (4) that the purchaser was thereby damaged; and (5) they were made before the contract was signed.

Therefore, it is my opinion that you may sue and recover damages from the seller and, further, that you may return the merchandise without paying for it.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The Page Walking Dragline and the Page Automatic Bucket pave the road for a successful coal-stripping operation. Why do you think contractors and coal strippers insist on Page equipment?
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TRAFFIC News Digest

CENTRAL FREIGHT ASSOCIATION DOCKET

Docket 78103 (1)—Slag, crushed or crushed commercial (not granulated), a product of iron and steel blast or open hearth furnaces, in open or closed cars, as indicated, carload minimum weight 90 per cent. of marked capacity of car, except that when loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Hamilton, O., to Marion, Ind., 165 cents per net ton in closed cars and to St. Louis, Mo., 226 cents per net ton in open cars and 264 cents per net ton in closed cars.

Docket 78110 (2)—Sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding, ground, loam, moulding, moulding-bonded, naturally or otherwise, polishing, pulverized or silica), or gravel, in open-top cars, minimum weight 90 per cent. of the marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Elkhart, Ind., to Kalamazoo, Indianafield, Mich., 107 cents; Vicksburg, Menden, Mich., 96 cents; Nottawa, Mich., 90 cents; Howe, Ind., 88 cents; LaGrange, Ind., 94 cents; Wolcottville, Ind., 99 cents; Rome City, Ind., 94 cents; Avilla, Ind., 99 cents and LaOtto, Ind., 94 cents per net ton.

Docket 78116 (2)—(A) Sand, moulding, bonded (naturally or otherwise), in all kinds of equipment, sand (except moulding, bonded, naturally or otherwise, and except ground or pulverized sand), in closed equipment, minimum weight. (See note.) (B) Sand (except moulding, bonded, naturally or otherwise, and except ground or pulverized sand), in open-top equipment, minimum weight. (See note.)

Note—Carload minimum weight will be 90 per cent. of the marked capacity of the car, except that when car is loaded to full visible or cubical capacity, actual weight will apply. Establish on, from Havens, O., to Zelienople, Pa., (A) 198 cents; (B) 176 cents per net ton.

Docket 78124 (2)—Limestone, agricultural, unburned in bulk in open-top cars, carload minimum weight 90 per cent. of marked capacity of car except that when car is loaded to full cubical or visible capacity, actual weight will apply. Establsh on, from Genoa, O., to Topeka, Ind., 127 cents per net ton.

Docket 78126 (2)—Sand and gravel, in straight or mixed carloads, as described in Rule 15, Description A, I.C. Railroad tariff 12321-I, minimum weight 90 per cent. of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight applies. Establish on, from Riverton, Ind., to Rockport, Ind., 132 cents net ton. (To apply in open-top cars.)

Docket 78167 (2)—Slag, crude, granulated or crushed (the product of irón and steel furnaces), in bulk, in open-top equipment, carload minimum weight 90 per cent. of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Youngstown, O., to Houston Junction, Pa., 88 cents per net ton.

Docket 78169 (1)—Slag, crushed (the product of iron and steel furnace), in bulk, in open-top equipment, carload minimum weight 90 per cent. of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Steubenville and Mingo Junction, O., to Short Creek, W. Va., 44 cents net ton. To be issued to meet barge competition and will expire with December 20, 1945.

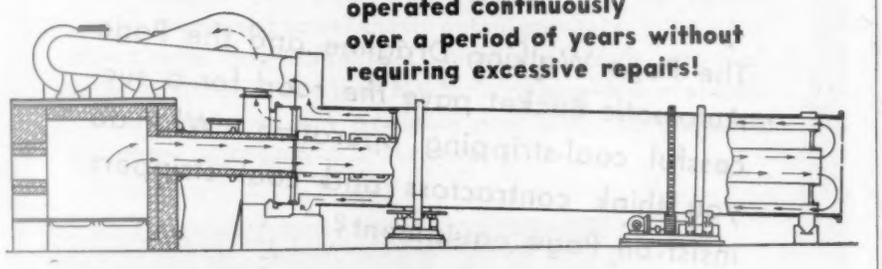
Docket 78171 (1)—Limestone, agricultural, unburned (not ground or pulverized), in bulk, in open-top cars, carload minimum weight 90 per cent. of marked capacity of car, except when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Speed, Ind., to Ferdinand, Ind., 121 cents per net ton.

Docket 78172 (2)—Dolomite, roasted (refractory dolomite, in granular form, treated or untreated, clinkered or burned to a dead state), carload minimum weight 80,000 pounds. Establish on, from Narlo and Maple Grove, O., to Duluth and Steelton, Minn., 23½ cents.

Docket 78185 (1)—Lime, common, hydrated, quick or slaked, carload. Establish on, from Ludington, Mich., to Ashtabula, O., 20 cents, minimum weight 30,000 pounds and 17 cents, minimum weight 50,000 pounds; Pittsburgh, Pa., 23 cents, minimum weight 30,000 pounds and 18 cents, minimum weight 50,000 pounds.

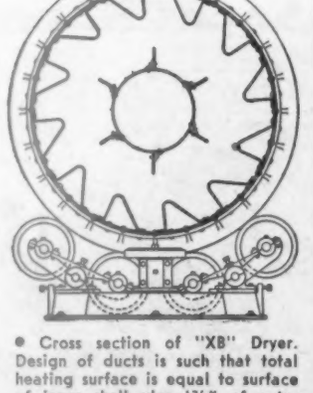
Docket 78182 (1)—Sand and gravel. Establish on, from Aurora, O., to various points in Ohio, rates in cents per net ton

HERE'S THE ONLY HIGH TEMPERATURE INDIRECT HEAT DRYER which can be operated continuously over a period of years without requiring excessive repairs!



• Hot furnace gases pass through central cylinder to end of shell where they are deflected through a header to V-ducts attached to inside of outer shell. Returning through these V-ducts, gases are discharged through head by an induced draft fan.

Note sketch above.



• Cross section of "XB" Dryer. Design of ducts is such that total heating surface is equal to surface of inner shell plus 1¾" of outer shell area.

It's the

RUGGLES-COLES

Class "XB" DRYER

NO { CONTAMINATION DISCOLORATION EXCESSIVE DUST LOSS

• Material is fed into space between inner and outer cylinders, falling alternately upon the hot inner shell and on the hot ducts attached to inside of outer shell. It is delivered dry through openings in outer shell between ducts at discharge end. A small induced draft fan connected to annular space controls amount of air drawn through the drying material.

The "XB" Dryer has a higher thermal efficiency than many single shell direct heat dryers.

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CONICAL MILLS | COUNTER CURRENT CLASSIFIERS | THICKENERS CLARIFIERS | RUGGLES-COLES DRYERS | CONSTANT WEIGHT FEEDERS | TUBE ROD AND BATCH MILLS

as shown in Exhibit A.

EXHIBIT A

From Aurora, O., to	*Proposed Rate*
Cleveland, O.	55
Lorain, O., Lowellville, O.	94
Steubenville, O.	127
Toledo, O.	128
Warren, O.	66
Youngstown, O.	88

Docket 78190 (2)—Agricultural limestone, not ground or pulverized, agricultural limestone screenings, unburned, in bulk, loaded in open-top cars only, carload minimum weight per car 90 per cent. of marked capacity except that when car is loaded to full visible capacity actual weight will apply. Establish on, from Rimer, O., to Benton, Elkhart, Goshen, Millersburg, New Paris, Ind., 127 cents; Warsaw, Ind., 121 cents per net ton.

Docket 78194 (2)—Limestone, ground or pulverized, unburned, minimum weight 60,000 pounds. Establish on, from Bettsville, Gibsonburg, Maple Grove, Millersville and Woodville, O., to Salem, N. J., 391 cents per net ton.

Docket 78195 (1)—Agricultural limestone, unburned, not ground or pulverized, in bulk, in open-top cars, carload minimum weight 90 per cent. of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Speed, Ind., to C.I.&L. Railroad stations in Indiana, representative rates as shown in Exhibit A.

EXHIBIT A—W.D.A. No. 78195
(Cents per net ton)

	Proposed
Monon, Ind., Reynolds, Ind., Smithson, Ind., Chalmers, Ind.	149
Brookston, Ind., Ash Grove, Ind., Battle Ground, Ind., LaFayette, Ind., Taylors, Ind., South Raub, Ind.	143
Romney, Ind., Linden, Ind., Cherry Grove, Ind.	138
Crawfordsville, Ind., Whitesville, Ind., Ladoga, Ind., Bainbridge, Ind., Roachdale, Ind., Putnamville, Ind., Cloverdale, Ind., Wallace Junction, Ind.	132
Greencastle, Ind., Limedale, Ind., Quincy, Ind., Gosport, Ind., Stinesville, Ind.	127

Docket 78227 (2)—Slag, commercial, crushed, carload, in bulk, in open-top equipment, minimum weight 90 per cent. of marked capacity of car, except that when car is loaded to cubical or visible capacity, actual weight will apply, from Benwood and Wheeling, W. Va., to Sutton, W. Va., 154 cents net ton.

Docket *78228 (2)*—Agricultural limestone, not ground or pulverized, in bulk, in open-top cars, carload minimum weight 90 per cent. of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Piqua, O., to Topeka, Ind., 138 cents net ton.

Docket 78241 (1)—(A) Lime, viz.: Common, hydrated, quick or slaked, in straight or mixed carloads, and mortar, dry building, minimum weight 30,000 pounds; (B) lime, viz.: Common, hydrated, quick and slaked, in straight or mixed carloads, minimum weight 50,000 pounds. Establish on, from Buffalo, N. Y., to stations in Pennsylvania, representative rates as shown in Exhibit B. (Not reproduced here.)

ILLINOIS FREIGHT ASSOCIATION

IRC 243-18—Fuller's earth, carloads, minimum weight 60,000 pounds from Olmsted, Ill., to Minneapolis, Minnesota Transfer, St. Paul, Minn., and points subject to the same rate. Present—39 cents. Proposed—Fuller's earth, except crude—29 cents to all destinations except Boardman, Wis., New Richmond, Wis., Fridley, Minn., to which points 30 cents per 100 pounds, being Class 16 rates. Crude Fuller's earth—26 cents to all destinations, being minimum rate.

IRC 243-19—Fuller's earth. Will also apply on mechanical mixture of Fuller's earth and clay or diatomaceous earth or infusorial earth or other inert materials, provided the weight of the clay or diatomaceous earth or infusorial earth or other inert materials content does not exceed 15 per cent. of the total weight, minimum weight in bags or in bulk 50,000 pounds; in barrels 40,000 pounds from Olmsted, Ill., to Rockford, Ill. Present— 27 cents. Proposed—380 cents net ton.

ORMV 762-17—Phosphate rock, ground or not ground, slush and floats (refuse and washings from phosphate rock), and soft phosphate, not acidulated nor ammoniated, in bags or in bulk, carloads, minimum weight 100,000 pounds or the marked capacity of car if less, from phosphate rock mines in Florida as named in Item 300-series to A.C.L. Tariff 91-27B, I.C.C. B-3098 and origins named in Item 40 of S.A.L. Ry. Tariff 66-B, I.C.C. A-8097, to Pittsfield, Ill. Present—class or combination. Proposed —735 cents gross ton.

ORMV 762-18—Phosphate rock, carloads, as described in A.C.L. R.R. Tariff 91-27-B, and S.A.L. Ry. Tariff 66-B, from Florida points to Lacon and Washington,

Extra Protection at these Vital Points

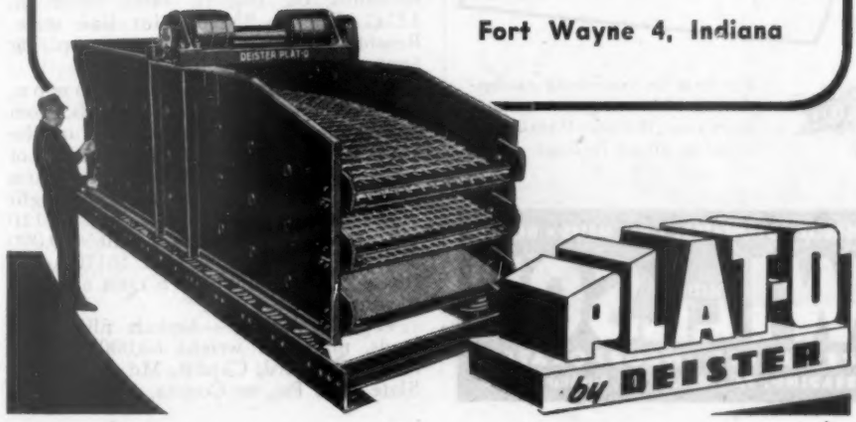
At every point subject to wear . . . at every point where efficient performance and long wear-life require extra strength and ruggedness . . . the designers of Plat-O Vibrating Screens have provided these *extra* protections:

Sides and framework are of all-steel, all-welded construction. Bearings and drive shaft are oversize. There are only two bearings . . . both are fully lubricated in oil . . . neither bearing carries any part of the screen weight. Screen cloth is held under automatic tension to prevent whipping. Cloth on any one deck can be easily changed without touching the other decks.

Deister Machine Company engineers can show you many similar features about Plat-O Screens that will give you *better sizing — cheaper*. Why not ask for details? One, two, three and four deck models in sizes (actual screening area) from 2½′ x 4′ to 5′ x 12′.

DEISTER MACHINE COMPANY

Fort Wayne 4, Indiana



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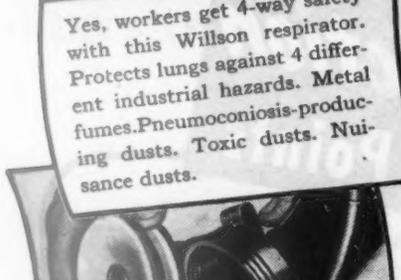
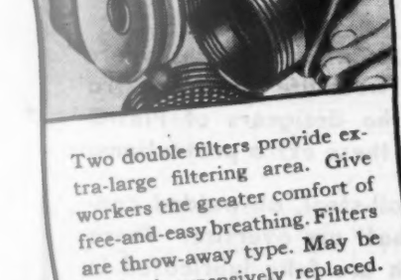
Yes, workers get 4-way safety with this Willson respirator. Protects lungs against 4 different industrial hazards. Metal fumes. Pneumoconiosis-producing dusts. Toxic dusts. Nuisance dusts.



Two double filters provide extra-large filtering area. Give workers the greater comfort of free-and-easy breathing. Filters are throw-away type. May be easily, inexpensively replaced.



Face piece available in two sizes to fit either small or large face. Both sizes carry Bureau of Mines approval. Compact, the respirator may readily be worn under a welding helmet.

For help on your lung-protection problems, get in touch with your Willson Distributor or write direct to Dept. PQ-12.

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PRODUCTS INCORPORATED

READING, PA., U. S. A. Established 1870

Ill. Present—class or combination. Proposed—735 cents gross ton.

Docket IRC 511-232 — Limestone, ground, carload. To restrict rates from St. Louis, Mo., East St. Louis, Ill., and points in the East St. Louis Switching District, Granite City, Venice, National Stock Yards, Krause, Nameoki, Valmeyer and Edwardsville, Ill., on ground limestone to apply in bulk only.

Docket IRC 511-297—Sand, viz.: Bank, glass, moulding, silica, blast, core, engine, filtering, fire, or furnace, foundry, grinding, polishing or loam, carload, from origins in Illinois not exceeding 150 miles from Chicago to destinations in Illinois intermediate to Chicago.

(Cents per 100 pounds)

Distance	*Present*	*Proposed*
30 miles.....	3	3.25
55 miles.....	3.5	3.75
85 miles.....	4.5	5
130 miles.....	5	5.5
150 miles.....	6	6.5

Meeting July 17, 1945, 10 a. m.

TRUNK LINE ASSOCIATION

42841 (shipper)—Stone, natural, other than bituminous asphalt rock, crushed, N.O.I.B.N., carloads, minimum weight 90 per cent. of marked capacity of car, etc., from Martinsburg, W. Va., to Aquashicola, Palmerton, Palmerton (Dela. Ave.), and Palmerton East, Pa., 198 cents per net ton, in lieu of present rate of 22 cents per 100 pounds. Reason: Comparable with rates applying from and to other points.

42842 (shipper)—Ganister rock, not ground, carloads, minimum weight 90 per cent. of marked capacity of car, etc., from Narco, Pa., to Womelsdorf, Pa., 286 cents per net ton, in lieu of present combination rate of 356 cents. Reason: Comparable with rates applying from and to other points.

42855 (shipper)—Fluxing stone, carloads, minimum weight 90 per cent. of marked capacity of car, etc., from Pounding Mill, Va., to Roanoke, Va., 107 cents per gross ton, in lieu of present sixth class rate of 19 cents per 100 pounds. Reason: Comparable with rates from and to other points.

42865 (shipper) — Gypsum rock, crude, carloads, minimum weight 90 per cent. of marked capacity of car used, but not less than 80,000 pounds, from Akron, Clarence Centre, Garbutt, Oakfield, Victor, Wheatland and Wheatville, N. Y., to Osborn, O., 286 cents per net ton, in lieu of present sixth class rates. Reason: Comparable with rates applying from and to other points.

42866 (shipper)—Limestone, broken, crushed ground or pulverized, carloads, minimum weight 60,000 pounds from South Bethlehem, N. Y., to numerous destinations in New York and Vermont, as per Exhibit A, copy of which will be furnished on request, rates based on I.C.C. Docket 25220 joint line scale. Reason: Comparable with rates applying from and to other points.

42870 (shipper)—Lime, common, hydrated, quick or slaked, carloads, from Accord, N. Y., to various stations on the D.L.&W. R.R., as per exhibit, copy of which will be furnished on request, rates based 110 per cent. (minimum weight 30,000 pounds) and 80 per cent. of 110 per cent. (minimum weight 50,000 pounds), on I.C.C. Docket 16170 scale. Reason: Comparable with rates applying to other points.

42876 (shipper)—Asphalt filler, carloads, minimum weight 60,000 pounds, from Whiteford, Cardiff, Md., Delta and Slate Hill, Pa., to Corona, L. I., N. Y., 330 cents per net ton, in lieu of present sixth class rate of 23 cents per 100 pounds. Reason: Comparable with rates applying to other points.

Docket 42945 (shipper)—Stone, broken, carload minimum weight 90 per cent. of marked capacity of car, etc., from Texas, Md., to Richmond, Va., $1.93 per net ton, in lieu of present 6th class rate of 22 cents per 100 pounds. Reason—Comparable with rates applying from and to other points.

Supplement 1 to 42275 (carriers; increase)—To increase rate on limestone, unburned, ground or pulverized, carload from origins in Trunk Line Territory to Illinois Central Railway Stations taking index numbers 3,240 to 3,250, as published in Item 5,246 of Agent Curlett's Tariff 23-N, I.C.C. number A 823, to reflect the Peoria basis of rates, as covered by station number 2,290.

Docket 42969 (shipper)—Quartzite (silica rock), crude, broken or crushed, not ground or pulverized, in open-top cars, carload minimum weight 90 per cent. of marked capacity of car, etc., but not less than 80,000 pounds from Greenlee (Natural Bridge), Va., to Alloy, W. Va., $1.87 per net ton, in lieu of present rate of $2.09. Reason: Comparable with rates applying from and to other points.

WESTERN TRUNK LINE

New Applications

Docket X-E-41-681 — Sand (except sands of value, viz.: Asbestos, filter, glass, moulding, or silica), gravel, crushed stone and rip rap stone, straight or mixed carload, from LaPlatte, Neb., to Aircraft Plant (Ft. Crook), Omaha, South Omaha and Lincoln, Neb. Proposed—To Lincoln, Neb., 45 cents per net ton. To Aircraft Plant (Ft. Crook) and Omaha, Neb., 40 cents per net ton. (By shipper.)

Docket E-41-682 — Stone, broken, crushed or ground, carload minimum weight 90 per cent. of marked capacity of car but not less than 50,000 pounds from Morton, Minn., to Chicago, Ill., Peoria, Ill., Burlington, Ia., Clinton, Ia., Davenport, Ia., Dubuque, Ia., Fort Madison, Ia., Keokuk, Ia., also points named in M.&S.T.L. Tariff No. 657-F, I.C.C. B-1020 as taking Chicago or Peoria rates. Proposed—14 cents per 100 pounds.

Docket D-11-112—Cement, viz.: Hydraulic, masonry, mortar, natural or Portland and other commodities described in Item No. 5 of S.W.L. Tariff No. 71-D and Item No. 10-A, Supplement 15 to C.F.A. T.B. Tariff No. 547-A, carload from points of origin in Illinois, Indiana, and Minnesota named in S.W.L. tariff No. 71-D and C.F.A. T.B. Tariff No. 547-A to points in Oklahoma and Texas in so-called Scale IV territory, also to points in Kansas in that portion of scale IV territory to which rates were reduced to basis of I.C.C. docket 8182, Scale III from Kansas producing points on state and interstate traffic. Proposed—Establish rates on basis of I.C.C. Docket 8182. Scale III and formula. Representative points:

To	*(1)*	*(2)*	*(3)*
Amarillo, Tex.	37	40	..
Boise City, Okla.	37	39	36

(1) Proposed—From Chicago, Ill.
(2) Proposed—From Mitchell, Ind.
(3) Proposed—From Mankato, Minn.

Docket E-8-600—Clay, crude or ground, carload, from Casper, Wyo., to Chicago, Ill., and Mississippi River points. Applies only to Mississippi River points named in Item No. 25 (except

St. Louis, Mo.) and only on traffic destined to Memphis, Tenn., or to points east of the Illinois-Indiana state line or Southeastern or Carolina territories.

Rates: Proposed—

To	Rates	Minimum Weight
Chicago, Ill...	39c	60,000 pounds
Mississippi River territory	30c	60,000 pounds

Docket E-8-601—Clay, crude or ground, carload, minimum weight 60,000 pounds from Riverton and Lander, Wyo., to (a) Chicago, Ill.; (b) Mississippi River points named in Item 25 of W.T.L. Tariff 18-R (except St. Louis, Mo.) on traffic destined for Memphis, Tenn., or for points east of the Illinois-Indiana state line or Southeastern or Carolina territories. Rates—(a) Proposed 44 cents per 100 pounds; (b) Proposed 36 cents per 100 pounds.

WESTERN TRUNK LINE DOCKET

E-8-584—Clay, crude or ground, carloads, from Belle Fourche, S. D., to Pueblo, Portland and Canon City, Colo., 31 cents, being proposed rate, minimum weight 80,000 pounds. (By shipper.)

E-41-673—Ground limestone, carloads, from representative Minnesota points:

To	(*)	(†)	(‡)
Manyaska, Minn.	18	17	...
Granite Falls, Minn...	21	21	...
Green Valley, Minn..	...	...	18
Winthrop, Minn.	...	19	...
Redwood, Minn.	19	...	...

*Proposed—Alton, Ill.
†Proposed—Louisiana, Mo.
‡Proposed—Hannibal, White Bear, Mo., and Quincy, Ill.

E-41-674—Stone, broken, crushed or ground, carloads, from Cannon, Mo., to Rosemount, Minn., (Gopher Ordnance Plant). Proposed—14 cents per 100 pounds. (By shipper.)

Docket E-43-184.—Stone, *viz.*: Flintstone linings (silex linings), minimum weight the marked capacity of the car. From Jasper, Minn., to Des Moines and Mason City, Ia. Proposed (by shipper), 11 cents per 100 pounds.

Docket E-41-668.—Limestone, crushed or ground, carload from Mosher, Ste. Genevieve, Marlo, Bonne Terre, Desloge, Doe Run Lead Company's Mill No. 3, Flat River, Rivermines and St. Francois, Missouri, to stations in Iowa and Minnesota, *viz.*: *St.* Paul, Minneapolis and Transfer, Minn., and Group 11 Mason City, Ia., Group 18 (Albert Lea, Minn.), Group 10 (Fairbault, Minn.), Group 20 (Mankato, Minn.), and Group 29 (McIntire, Ia.). Proposed (by shipper) to establish a rate of $3.40 per ton of 2,000 pounds.

SOUTHERN FREIGHT ASSOCIATION

33008 (shipper; suggested by carrier)—Establish 860 cents per gross ton on phosphate rock, ground or not ground, not acidulated or ammoniated, in bags or in bulk, carloads, minimum weight 100,000 pounds or marked capacity of car if less from Florida mines to Laredo, Tex., applicable only for export to Mexico.

33085 (shipper; suggested by carrier) On crude clay, as described under Item 740 of S.F.T.B. Tariff 10-U, it is proposed to establish rate of 55 cents per net ton from Jasper, Ala., to Bessemer, Ala.

33103 (carrier)—Establish on, clay, carloads from N.C.&St.L. Ry., West Tennessee and Kentucky pits named in Clay Tariff (Freight Tariff 10-U), I.C.C. 809, R. H. Hoke, Agent, rate of 462 cents per ton 2,000 pounds.

33107 (shipper; suggested by carrier)—Establish joint through commodity rates on molding sand, carloads, as described in Item 517 of Agent R. H. Hoke's Freight Tariff No. 388-F. I.C.C. 840, from Lexington, Tenn., to Canton, O., of 374 cents; to St. Paul, Minn., 418 cents and to Minneapolis, Minn., 418 cents and to Minneapolis, Minn., 429 cents per ton 2,000 pounds.

DOCKET AND STATUS REPORT OF PRIOR SOUTHERN FREIGHT ASSOCIATION SUBMITTALS

Docket 33298 (shipper, suggested by carrier)—Establish rate of 180 cents per ton (2,000 pounds) on clay, crude, carload, as described in Item 665 of S.F.T.B. Clay Tariff 10-U, I.C.C. 809 from Cordovan, Ala., to Trice, Georgia.

Docket 33305 (carrier)—Establish joint through commodity rate of $8.15 per ton (2,000 pounds) on ground limestone, in carloads from Cartersville, Ga., to Rumford, Me.

Docket 33315 (shipper, suggested by carrier)—Establish commodity rate of 27 cents per hundred weight on talc, ground or pulverized, carload minimum weight 60,000 pounds, from Glendon, N. C., to Kepler's Mill, Pa.

Docket 33243-1 (carrier) — Gypsum, crude or crushed, carload 80,000 pounds. Establish rate 500 cents per ton (2,000 pounds) from Blue Rapids, Kan., to Birmingham, Boyles, North Birmingham and Phoenixville, Ala.

SOUTHWESTERN FREIGHT BUREAU

36230 (1)—Silica sand, Missouri points, to Rio Grande crossings. To establish export rate of 468 cents per ton of 2,000 pounds, minimum weight 90 per cent. of marked capacity of car. on silica sand from Crystal City, Festus and Sand Pit, Mo., to Rio Grande crossings (Brownsville, Eagle Pass, El Paso and Laredo, Tex.), when for export to Mexico.

SOUTHWESTERN FREIGHT BUREAU DOCKET

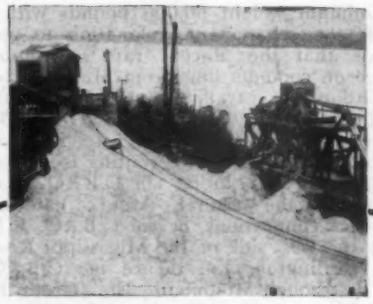
Docket 36670 (1)—Gypsum rock, Acme, Tex., to Tampa, Fla. To establish rate of $6.80 per ton of 2,000 pounds on gypsum rock, carload, minimum weight marked capacity of car used, except when loaded to visible capacity, but not less than 80,000 pounds, from Acme, Tex., to Tampa, Fla.

Docket 36702 (1)—Crushed rock and soil, Sweetwater, Tex., to Craig, Colo., Lusk and Casper, Wyo. To establish rates in cents per ton of 2,000 pounds on crushed rock and soil, carload, from Sweetwater, Tex., to Craig, Colo., of 600 cents, Lusk and Casper, Wyo., 650 cents, minimum weight 90 per cent. of marked capacity of car, except that actual weight will govern when car is loaded to full visible capacity.

Docket 36777 (2)—Lime, Ste. Genevieve and Mosher, Mo., to New Orleans, La. To establish rate of $3.84 per net ton on lime, common, in bulk, carloads, minimum weight 80,000 pounds from Ste. Genevieve and Mosher, Mo., to New Orleans, La., to alternate with the present rate of $4.20 per net ton, minimum weight 30,000 pounds.

TRANSCONTINENTAL FREIGHT BUREAU

2235 (carrier)—Common lime, carloads, WB, routing: Proposal to amend Item 3740, Tariff 4, by prefixing the Group E rate of 56 cents per 100 pounds,



A small Sauerman Scraper stockpiles crushed silica rock on ground space alongside a washery and reclaims this stored material as required to a drying plant. The entire installation is simple and it provides flexible handling capacity at small over-all cost.

CUT COSTS
by moving materials the SAUERMAN way

ASK any operator of a Sauerman Scraper or Cableway and he will tell you this is generally the cheapest way to move materials from pits, banks, rivers or stockpiles.

These machines dig, haul and dump automatically in one operation. They are adaptable to a variety of ground conditions and come in sizes to meet almost every capacity requirement.

Operator has finger-tip control of entire operation — power demand is moderate— repairs are few and simple.

Sauerman engineers will gladly study your digging or stockpiling problems. Their advice may save you money and will be given free. Write for our catalog and tell us about your problems.

SAUERMAN BROS., Inc.
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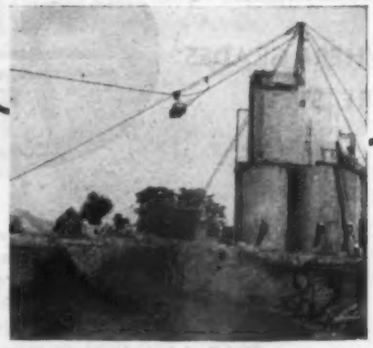

This 80 t.p.h. screening plant is served by a Sauerman Slackline Cableway of medium size which moves the required yardage from deep wet pit to top of plant at a labor cost of slightly over 1¢ per yard.

minimum weight 60,000 pounds with a reference character, explanation to provide that the 56-cent rate will apply also on common lime from Mosher, Mo., (Group E) on traffic routed *via* Missouri-Illinois R.R. to Centralia, Ill. (Group D), thence *via* C.B.&Q. R.R. to East St. Louis, Ill. (Group E); routing from East St. Louis, Ill., to be *via* C.B.&Q. R.R. through the Laurel, Mont., gateway, thence connections, or *via* C.B.&Q. R.R. up the west side of the Mississippi River to Burlington, Ia., thence *via* C.B.&Q. R.R. through Monmouth, Ill., (Group E) to Minneapolis, Minnesota Transfer or St. Paul, Minn., thence connections. Publication of the proposed routes to be accomplished by either (a) reducing the rate at the intermediate Group D points from 62 cents to 56 cents per 100 pounds, or (b) obtaining fourth section relief.

TEXAS-LOUISIANA FREIGHT BUREAU

8028—Shippers' proposal to establish rate of 5 cents per 100 pounds on lime, in bulk, carloads, minimum weight 80,000 pounds from Corpus Christi to Bishop, Texas; rate expires December 31, 1945.

CENTRAL FREIGHT ASSOCIATION

77822 (2)—Sand (except blast, core, engine, filter, fire or furnace, foundry, glass grinding or polishing, loam, molding and silica), and gravel, in open top cars, carloads, minimum weight 90 per cent. of marked capacity of car, except when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Riverton, Ind., to Maroa, Ill., 97 cents per net ton.

77863 (2)—Slag, crushed or crushed commercial in open-top cars, minimum weight 90 per cent. of marked capacity of car, except when car is loaded to full visible or cubical capacity, actual weight will apply. Establish on, from Jackson, O., to points in West Virginia on the N.Y.C. (W), rates as shown in Exhibit A.

77898 (2)—Stone, fluxing, furnace or foundry, melting or refractory, unburned, in bulk, in open-top cars, carloads, minimum weight 90 per cent. of marked capacity of car, except that when cars are loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Hillsville, Walford, Shaw Junction, Pa., to Trafford, Pa., 103 cents gross ton; Latrobe and Uniontown, Pa., 116 cents gross ton.

77908 (1)—Sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), and gravel, in open-top cars, minimum weight 90 per cent. of marked capacity of car except when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Hamilton, O., to Crane, Ind., 149 cents net ton.

77911 (1)—Stone, crushed, in bulk, in open-top cars, minimum weight 90 per cent. of marked capacity of car, except when car is loaded to full cubical or visible capacity, actual weight will apply. Establish on, from Lehigh, Ill., to Ockley, Ind., 124 cents net ton to expire December 20, 1945.

Homer A. Belt, 58, president of the Columbus Conveyor Company, Columbus, Ohio, died recently after an extended illness. Mr. Belt was one of the founders of the Columbus Conveyor Company in 1918. Chester Isaac was appointed to succeed Mr. Belt.

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AND MUD IS DEEP

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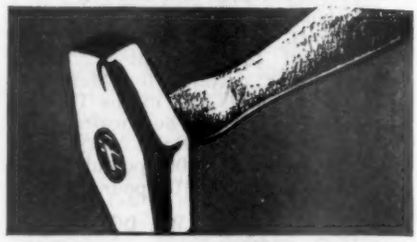

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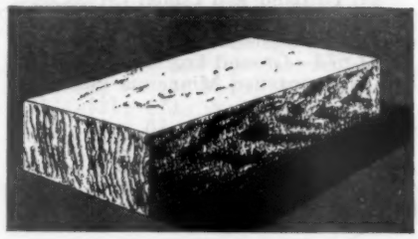

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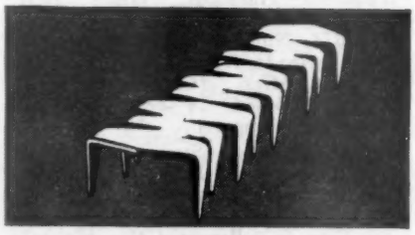

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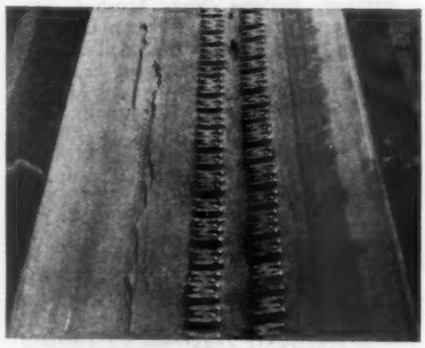

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Mill Supply Division
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NEW MACHINERY and SUPPLIES

● Pile-sinking Pump

The SFI pump, No. 10, developed by the LaBour Company, Inc., Elkhart, Indiana, is described by the manufacturers as an independently operated, self-priming centrifugal pump capable of sinking piles by means of a high-velocity stream of water. Among the additional uses claimed for the pump are for deck washing, bilge pumping, ballast transfer, extinguishing fires, dock use and other similar tasks.

Special equipment needed for "jetting"—pile driving by a high-pressure stream of water—also is furnished by the LaBour company. In this process the pile is held in position against the river bottom. The pump directs a powerful stream of water against the ground at the base of the pile, cutting it away and causing the pile to drop into the hole to the desired depth. The stream is then used to force the material just removed back against the pile and pack it firmly in place.

● Traveler Excavator

The Traveler, a new Byers excavator described by its manufacturers, the Byers Machine Company, Ravenna, Ohio, as the "first mobile full-circle one-

One-man power shovel.

man-operated power shovel," has recently been placed on the market. The Traveler is a ½-cubic-yard excavator designed to make mobility available for shovel service, as well as for crane service. Overall width of the lower chassis is 8 feet, to meet state highway regulations; wheel base of 9 feet approximates the ground-bearing length of most ½-yard shovel crawlers and permits digging over front and rear of the machine.

The operating machinery for the Traveler is claimed to be as advanced as the lower chassis, with forced oil lubrication of all enclosed gears and with revolutionary "Airflex" clutches in place of conventional live-end-dead-end clutches.

● Lubricant-covered Wire

Wire rope that is entirely covered with a green-colored lubricant has recently been announced by the American Chain & Cable Company, Bridgeport, Connecticut, for their two wire rope divisions, the American Cable Division and the Hazard Wire Rope Division. Only their highest grade rope (preformed of improved plow steel) will be so lubricated. Their non-preformed ropes made of improved plow steel will continue to be identified by a single green strand.

Emerald-green having been adopted, American Chain & Cable established a formula for a superior lubricant colored green for use as its identifying strand. Ropes having the green strand, retired from all manner of service and returned to the mill for inspection and testing, revealed that wires protected with the green lubricant were in far better condition than the wires under the black lubricant in adjacent strands.

American Chain and Cable's "Green-Lube" has high viscosity and remarkable capacity for adhesion to the surfaces of the wires. It has a grease-like consistency at normal temperatures and is applied hot and in a molten state by the pressure method for complete coverage of every wire and filling and "stuffing" of the voids between wires.

● LeTourneau Charts

R. G. LeTourneau, Inc., has issued a new wall chart of cable requirements for all LeTourneau equipment, available free to operators and maintenance men. The chart stresses the service angle and supplies tips on how to obtain longer wear from wire rope such as Tournarope, the preformed, tightly-wound steel cable developed by LeTourneau.

● New Diesel Series

The Joshua Hendy Iron Works, Sunnyvale, California, has added a new line of Series 20 Diesels in 6 and 8-cylinder models, ranging from 190 to 250 horsepower at 900 r.p.m., to its present line. The D-26 and D-28 are made in marine, stationary and Diesel-electric models of the four-stroke cycle type, designed for heavy-duty, medium-speed operation. They are air starting and completely enclosed, with overhead camshaft, unit fuel pumps and injectors, precision-type bearings and full pressure lubrication. Marine models are direct reversing.

The engines have cast-iron, monoblock construction with under-hung crankshaft, removable cylinder liners and auxiliary drives arranged at either end. They are entirely self-contained, all main accessories being engine mounted.

Series 20 engines are single acting, with 7¼-inch bore and 8½-inch stroke. The cast-iron pistons are of simple design with four compression and two oil-control rings. The crankshaft is cast iron, with hollow crank pins and main journals. Lubrication is carried from the main journals to the crank pins through inserted steel tubes.

Fresh-water cooling employs a centrifugal pump, which sends the water first through the oil cooler and thence to the engine water header, from which it passes through a metering hole to each cylinder liner. Individually cast cylinder heads were designed for maximum strength and uniform cooling.

The 2-inch-diameter, ground-steel camshaft is fitted with forged, hardened and polished steel cams. There are three cams per cylinder: intake, exhaust, and a third combining the functions of fuel injection and air starting. The use of unit fuel pumps and injectors, operating in conjunction with the overhead camshaft, is said to reduce the number of moving parts and to obviate the use of long, high-pressure fuel lines between a separate injector pump and the nozzles.

The fuel-control shaft is operated through anti-friction linkage from the governor, with emergency stop levers located at each end. Injectors are connected individually through spring-loaded linkages which permit the operator to shut off any injector during operation.

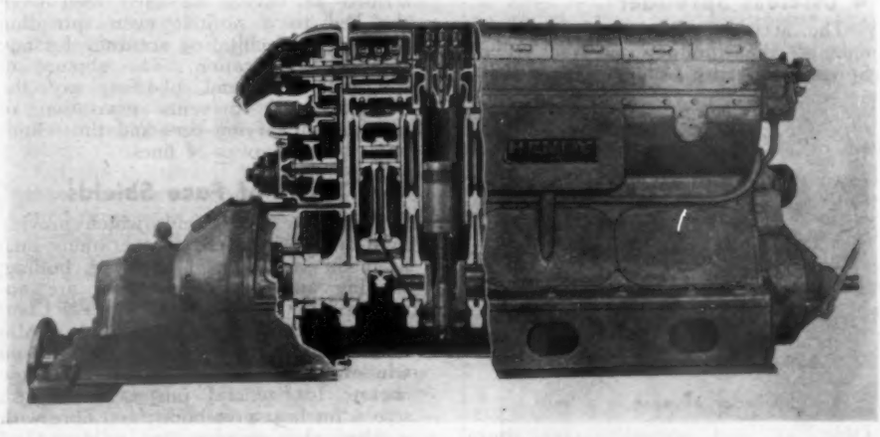
Optional engine equipment includes clutch power takeoffs, engine-mounted generator, pyrometer and thermocouples.

● Tractor-mounted Crane

Two new Lohse products, the 6R tractor crane and the 6RC tractor crane, have been placed on the market by the Henry Lohse Company, Inc., Newark,

Tractor crane with caster-type rear wheels.

New Jersey. Both are mounted on I.H.C. I-6 Industrial tractors and have overhead protection for the operator, who sits close to the front, thus obtaining good visibility. Model 6RC (shown in the illustration) is equipped with caster-type rear wheels for increased maneuverability.

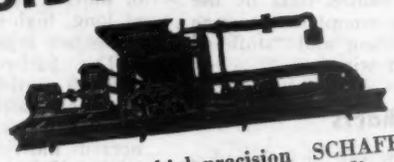


New Diesel series ranging from 190 to 250 horsepower.

RISING PRODUCTION

requires faster handling of raw and finished materials, as provided by

SCHAFFER POIDOMETERS



High-speed, high-precision SCHAFFER Poidometers for weighing, feeding and proportioning materials are pacing the drive for new production records in backing the war effort.

Besides boosting *quantity*, Poidometers assist in maintaining *quality* of products through the accurate proportioning of materials.

Write for Catalog No. 5 → SCHAFFER POIDOMETER CO.
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● Discless Spreader

The accompanying illustration shows one of the products of the "Even-Spread" Spreader Company, Owensville,

Spreader at work in a field.

Ohio, at work spreading agricultural lime in a field. The machine is described as having an even feed from the bed to a positive even spreading mechanism, facilitating accuracy for any speed of application. The absence of spinning discs and paddles, say the manufacturers, prevents separation of particles of varying sizes and thus eliminates blowing away of fines.

● 4 Types of Face Shields

Four new face shields which provide light-duty protection on operations such as metal sawing, acid handling, buffing, sanding and light grinding are announced by the American Optical Company, Southbridge, Massachusetts. Also announced are three types of button-on windows for the shields: clear cellulose acetate for general purposes; 24-mesh screen for heat protection; and fibre with a filter glass window for welding and scarfing.

The new face shields are light, comfortable, and sturdily made to withstand hard use. They are designed so that they

Shield offers full protection.

may be used without discomfort by workers who wear prescription glasses. All the parts are easily interchangeable.

The new F-100 face shield has an adjustable elastic headband which may be worn low on the head for additional comfort. Genuine leather sweatbands, like the windows, button on and are easily removed. A fibre headpiece holds the device comfortably and firmly on the head. The shield may be instantly thrown up when not in use and is held securely in position by friction joints. The removal of a pivotal nut, spider and washer permits instant interchanging of parts.

The F-200 is similar to the F-100, but in addition it is fitted with a standard spark deflector (or forehead guard) for extra protection.

The F-300 is nearly identical with the F-200, but its back headband is of fibre construction, styled to fit the lower head snugly and comfortably. The long band slides within a fibre sleeve in back; it is easily adjusted by a knurled nut, turning on a right and left hand threaded stud.

The F-400 has all the features of the F-300 shield, plus a full spark or head deflector, designed primarily for working in confined places where head bumps or lacerations may occur.

● Tractor Shovel

Several distinctive features are listed for the McCaffrey tractor shovel, manu-

Tractor shovel loading from side.

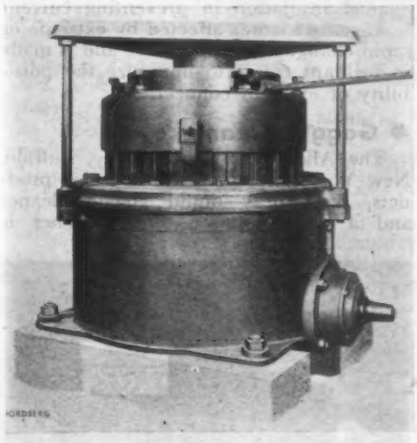
factured by M. P. McCaffrey, Inc., of Los Angeles. The company claims the

following advantages; power transmission from the front end through a countershaft to the rear winch; a shovel boom which pivots on the horizontal shaft at the top of triangular side structures; unobstructed vision for the operator; a bucket as wide as the tracks; ample clearance for loading into high-bodied trucks.

McCaffrey engineers also cite 100 per cent. cable control over the bucket, enabling the operator to dump the load from any height and immediately return the bucket to loading position by engaging the power-unit clutch.

● Streamlined Crusher

The Nordberg Manufacturing Company has announced that it will augment the present range of sizes of Symons Cone Crushers with a new series of intermediate sizes. All of the features



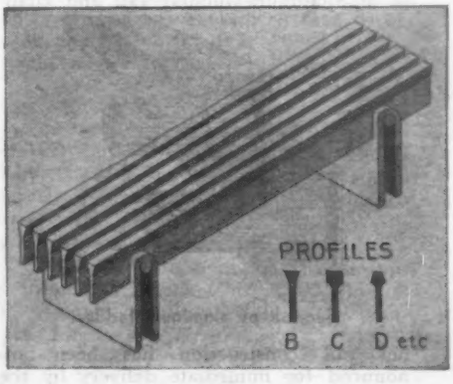
22-inch cone crusher.

of the present line will be incorporated in the new series—feed control, wide throw, automatic spring release against overload and large discharge area. In addition, the new series of cones will be of streamlined and compact construction, with a number of modifications and improvements.

The 22-inch Symons Cone Crusher, which will be the smallest of this new series, is illustrated in the accompanying photograph. The safety spring assembly which distinguishes the present line is contained within the housing on the new models.

● Slot Screens

Hendrick Wedge-Slot screens, manufactured by the Hendrick Manufacturing Company, Carbondale, Pennsyl-



Screen of wedge-shaped profile bars.

vania, are made of wedge-shaped profile bars of several types and sizes, held in position by U-shape holders. They are available for both wet and dry screen operations, to fit flat or curved, stationary or moving equipment. Slot openings are standard, from 1/200 to 1 inch. Materials used for the profile bars include plain and abrasion-resisting steels, stainless steel, copper-bearing steel, bronze and brass alloys and aluminum.

● Hardness Tester

An instrument identified by its manufacturer, the Steel City Testing Laboratory of Detroit, as the Portable Hardness Testing Hammer Type P, is said to furnish a welcome substitute for the expensive machinery formerly needed for testing materials for hardness.

The hammer consists of a piston and

Method of using tester.

a cylindrical housing. The latter is closed at one end with an inside thread cover, at the other with an open bushing. A strong spring between the cover and the piston presses the piston against the bushing. The tension of the spring can be adjusted by turning the cover. The piston is coupled with a striking piston, which projects through the bore of the bushing guided by an airtight fitting ring in the cylinder and carrying a steel ball on the end.

To operate, the hammer is rested against the material and the top is pressed down. At a certain point in the movement the piston, under pressure of the spring, moves against the inner end of the striking bolt and the ball hitting the material to be tested. After the hammer is released, the striking bolt or piston returns to its former position. Compressed air causes it to move slowly, thus preventing the spoiling of the impression made.

If the impression is smaller or larger than the size corresponding to the desired degree of hardness, the material is either too hard or too soft, as microscope and chart tests will reveal.

● New Type Mixer

A new 1-bag concrete mixer, the Kwik-Mix 6-S Dandie, has been announced by the Kwik-Mix Company, Port Washington, Wisconsin. Soon to be followed by new 16-S and 10-S models, the Kwik-Mix 6-S Dandie is welded throughout and utilizes high-strength steel exten-

PREFORMED WIRE ROPE DESERVES TO BE HANDLED WITH CARE. SEE WHAT ACTUALLY HAPPENS IN THESE CROSS-SECTION VIEWS.

GRIP...or

Laughlin "Fist-Grip" Safety Clip holds rope firmly by friction — with hardly any flattening.

CRUSH?

Ordinary U-bolts crush wires, frequently ruining rope ends. (Notice distorted hemp center under "U".)

(Nuts tightened to same tension with torque-indicating wrench in both cases)

"Fist-Grip" Clips protect your rope. 25% fewer can be used, because improved bearing surfaces deliver full rope power. They save time, too, because they go on faster — with any type wrench — and can't be put on backwards. They are the only clips with drop-forged bolts. Order test samples from your distributor today.

Distributed through mill, mine and oil field supply houses. For a complete catalog on Laughlin's wire rope and chain hardware, write to Dept. 3, The Thomas Laughlin Co., Portland 6, Maine.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

IT DOESN'T COST—IT PAYS TO USE *American* CRUSHERS

AMERICAN
Swing Hammer
CRUSHER

With its capacity to boost tonnage and its rugged, exacting construction to give continuous, troublefree service at low operating cost—American Crushers start paying their way as soon as they're put on the job.

Whether your operation calls for a workhouse job or a giant task—there's an American type and size to meet your specifications.

Heavy Duty construction of reinforced castings with machine-fitted sections, manganese steel hammers and crushing chamber lining, cast steel discs centered on heavy alloy steel shaft mounted in SKF spherical roller bearings, housed in grease lubricated, dust-tight pillow blocks.

Write for descriptive Bulletin

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1059 Macklind Avenue
St. Louis 10, Missouri

sively. A new selective skip shaker does not engage until the skip is partially emptied and ready for shaking.

The established Dandie Re-Mixing

Mixer handles 6 cubic feet of concrete.

action, combining buckets and blades inside the drum, provides thorough mixing. The tilted flow-line discharge chute, an exclusive feature on the Dandie Mixers, is said to empty the drum faster because it reaches deeper into the drum.

The Kwik-Mix 6-S Dandie is balanced on automotive type leaf springs and pneumatic tires. It mixes 6 cubic feet of concrete plus 10 per cent. and complies with A.G.C. standards for this new size.

● Dump Unit for Concrete

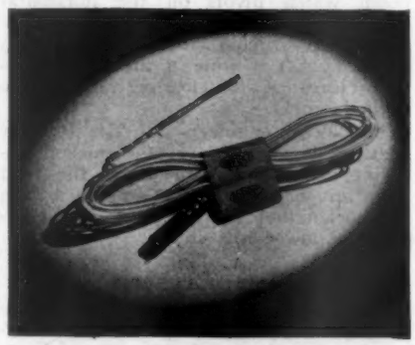
Special dump units designed and built for difficult problems in material handling are featured by the Daybrook Hydraulic Corporation, Bowling Green, Ohio. Shown in the accompanying illustration is body type A-54, used for hauling air-entrained concrete, mounted

Operator moves two levers simultaneously.

on a 7Da-Hi-Lift hydraulic hoist. The hoist and discharge controls are at the rear of the body. With the right hand the operator controls the concrete discharge gate lever; with the left, the lever raising and lowering the hoist.

● Improved Blasting Caps

All electric blasting caps now being produced by E. I. du Pont de Nemours & Company, have two improvements—nylon-insulated wires and rubber plug closures. The wire covering of tough,



Nylon-covered blasting caps.

abrasion-resistant nylon is the equal of enamel insulation in preventing current leakage. It is not affected by extreme or rapid changes in temperature and is made in brilliant colors to minimize the possibility of error in connections.

● Goggle Cleaner

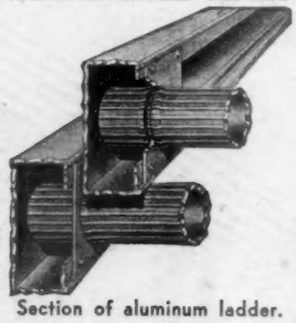
The Allen Optical Company, Buffalo, New York, announces its two new products, Sani-Spray liquid goggle cleaner and a goggle station. The cleaner is

Spray of cleaner released by push-button.

claimed by the company to be a means of making goggles fog-proof, thus saving time and insuring the worker's efficiency. The station is a steel atomizer cabinet which holds a quart of the cleaner, a supply of tissues and a receptacle for used tissues. A push-button releases a fine mist of Sani-Spray.

● Aluminum Ladders

A complete line of industrial ladders in all-aluminum tubular rail and chan-



Section of aluminum ladder.

nel rail construction has been announced for immediate delivery by the Duo-Safety Ladder Corporation, Oshkosh, Wisconsin. All-aluminum construction offers the advantages of light weight, greater strength and safety.

TRADE NOTES

The W. T. Walsh Equipment Company of Cleveland was host during the week-end of June 25 at an open house in its new building. Visitors to the plant had an opportunity to inspect new models and examine new features of design on post-war machinery.

A. W. Hedberg

Axel W. Hedberg, formerly St. Clair branch manager of the Parker Appliance Company of Cleveland, has been named works manager of the Marion Steam Shovel Company, Marion, Ohio. Mr. Hedberg had earlier been associated with General Motors Research, the Republic Steel Company and the Briggs Manufacturing Company.

The Hill Clutch Machine & Foundry Company of Cleveland recently announced a change in the firm's name to the Hill Acme Company.

Six leading manufacturing firms of Cedar Rapids, Iowa, recently co-operated to publish a booklet, in English and in Spanish, featuring the city's growing importance as a center of construction equipment processing. They are the Iowa Manufacturing Company, the La-Plante-Choate Manufacturing Company, Inc., the Universal Engineering Corporation, the Link-Belt Speeder Corporation, the Iowa Engineering Company (a production unit of the Fruehauf Trailer Company) and the Highway Equipment Company, Inc.

The appointment of A. C. Bekaert as comptroller of the Wickwire Spencer Steel Company and subsidiaries has been announced by E. P. Holder, president. Mr. Bekaert, who formerly was assistant treasurer of the firm, will make his headquarters at the company's executive offices in New York.

The Industrial Equipment Corporation of Pittsburgh has announced that its offices now are located at 705 First National Bank Building, Pittsburgh 22.

Towmotor Corporation of Cleveland recently announced the appointment of Ray E. Madden as district sales and service representative for the Chicago area, with offices at 6321 South Wentworth Avenue.

The company also announced the appointment of Frank Colker and Thomas F. Maloney as district sales representatives for the Detroit area.

Announcement was made recently by the Bristol Company, Waterbury, Connecticut, of the appointment of C. E. Mason as technical director of the company. Mr. Mason, who previously was associated with the Mason-Neilan Regulator Company of Boston, is nationally known in the field of automatic control.

Robins Conveyors, Inc., of Passaic, New Jersey, has announced that Thomas Robins, Jr., was elected president of the firm to succeed Thomas Matchett, who is retiring. Mr. Robins, who is also affiliated with several other firms, has been chairman of the company's executive committee since 1940.

Gwilym A. Price, a director and former vice-president of Westinghouse Electric & Manufacturing Company, has been named executive vice-president of the firm.

Nordberg Manufacturing Company of Milwaukee announces that its Navy "E" pennant now carries five stars and that its Maritime "M" pennant likewise has five.

An Army-Navy "E" award has been granted to the Gilbert Manufacturing Company and the Standard Salt & Cement Company of Stillwater, Minnesota, which are housed in one plant.

John A. Comstock has been appointed director of research and metallurgy for all divisions of the H. K. Porter Company, Inc. Mr. Comstock will be in charge of the central research and testing laboratory in Pittsburgh.

R. B. Holmes, formerly general manager of the Link-Belt Company's Atlanta plant, has been made general manager of the firm's Philadelphia plant operations, including its Olney Foundry Division. Rod S. Galloway has left his post as Pittsburgh general manager to succeed Mr. Holmes. His place, in turn, has been filled by Otto W. Werner, formerly district engineer at Pittsburgh. Allan Craig has been appointed division manager of the southeastern division at Atlanta.

J. L. Ray

Appointment of James L. Ray, widely known steam and gas-turbine engineer, has been announced by George F. Gayer, chief engineer of the Joshua Hendy Iron Works, Sunnyvale, California. Mr. Ray will head the company's gas and steam-turbine engineering department in San Francisco and supervise its enlarged technical staff. He was formerly chief gas-turbine design engineer of the Allis-Chalmers Manufacturing Company.

The Elastic Stop Nut Corporation of America has announced the appointment of L. H. Atkinson, formerly vice-president in charge of sales, as vice-president and director. Mr. Atkinson succeeds W. C. Collins, who resigned.

Frank Doyle, formerly sales engineer with the Ingersoll-Rand Company of New York, recently joined the Equipment Service Company of Birmingham, Alabama.

RYERSON STEEL IN STOCK

Call Ryerson when you need steel—any kind, shape, or size. Large stocks are available at ten convenient plants. Ask for a Ryerson Stock List—your guide to quick shipment of steel.

Principal Products Include:

Bars • Shapes • Structurals • Plates • Sheets
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Shafting • Screw Stock • Wire • Mechanical
Tubing • Boiler Tubes • Reinforcing Steels
Tool Steels • Babbitt • Nuts • Bolts • Rivets
Welding Rod • Etc.

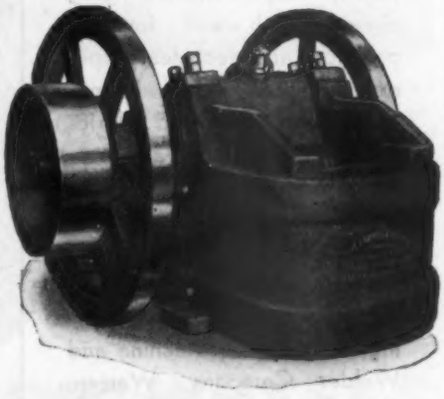
JOSEPH T. RYERSON & SON, Inc.

Plants at:

CHICAGO, MILWAUKEE, ST. LOUIS, DETROIT, CINCINNATI, CLEVELAND, BUFFALO, BOSTON, PHILADELPHIA, JERSEY CITY

FARREL BACON CRUSHERS

Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants. Engineering Service.



FARREL-BACON
ANSONIA, CONNECTICUT

The board of directors of the Enterprise Engine & Foundry Company of San Francisco recently elected the following officers: G. J. Panario, chairman; C. P. Hoehn, president; C. S. Herbert, executive vice-president and secretary-treasurer. In addition to Mr. Panario, Mr. Hoehn and Mr. Herbert, the following members were elected to the directors' board: W. I. Andrews, A. O. Stewart, W. E. Butts and C. H. Schimpff.

Further recognition for outstanding production of Diesel engines came to the Cooper-Bessemer Corporation, Mount Vernon, Ohio, on April 20, with the announcement that its Grove City, Pennsylvania, plant had been awarded a second renewal of its Army-Navy "E," originally presented April 8, 1944. The 112-year-old firm also flies a five-starred Maritime "M."

Paul L. Davies, president of the Food Machinery Corporation of Los Angeles, recently announced that the Dayton-Dowd Company of Quincy, Illinois, had been purchased as a branch of the Peerless Pump division of Food Machinery Corporation. The Dayton-Dowd Company, incorporated in 1919, will continue all present lines, and distribution will remain under the present sales staff.

Lake Shore Engineering Company, Iron Mountain, Michigan, manufacturers of mining, industrial and marine machinery, recently announced the awarding of a third gold star by the U. S. Maritime Commission to be added to their "M" pennant.

WE WANT . . .
DESIGN ENGINEERS AND DRAFTSMEN

experienced with creation of design and detail assemblies of HEAVY EXCAVATING MACHINERY, POWER SHOVELS, ROCK HANDLING CONVEYORS AND BULK MATERIAL HANDLING EQUIPMENT. Only persons with well founded practical and technical experience should apply. Permanent positions at good salaries and opportunities for advancement in a rapidly expanding organization will be possible to those who qualify. All replies confidential. Address J. F. Joy, Vice President—Engineering, The Federal Machine and Welder Company, Warren, Ohio.

The Farrel-Birmingham Company, Inc., has announced the appointment of Robert M. Honegger as general manager of the company's gear plant at Buffalo, New York. Mr. Honegger succeeds Lester D. Chirgwin, who was recently elected vice-president in charge of manufacturing in the Farrel - Birmingham plants at Ansonia, Derby and Stonington in Connecticut, and at Buffalo.

R. M. Honegger

The appointment of Howard W. Kelsey as sales promotion manager of the General Products Division, United States Rubber Company has been announced by Harry J. Haflin, general sales manager of the division.

Frederick G. Schrantz, vice-president of the Southwark division of the Baldwin Locomotive Works, recently resigned from his office. Robert G. Allen was appointed general manager of the division.

P. J. Degnon, vice-president of Mack Motor Truck Company, has been appointed manager of the firm's New England Division according to the announcement made by C. T. Ruhf, president of Mack Trucks, Inc. Mr. Degnon will make his headquarters in Boston. He replaces W. A. Maynard, who is retiring after 25 years of active service with Mack in New England.

The appointment of H. J. Ryan as construction machinery division sales manager of the Southwest Welding & Manufacturing Company, Alhambra, California, was recently announced by Earl B. Maloon, manager of that division. Mr. Ryan formerly was associated with the Worthington Pump and Machinery Corporation and more recently with the Navy Department, Bureau of Yards and Docks, at Chicago.

H. J. Ryan

To aid in expediting the government's lagging rubber programs, two experts from the rubber industry have been "drafted" for wartime service. John L. Collyer, president of the B. F. Goodrich Company, was appointed special director of rubber programs for the War Production Board; and J. Edward Trainer, vice-president for production of the Firestone Tire and Rubber Company, was named Mr. Collyer's assistant.

Vol. I, No. 1 of *Westinghouse Newsfront*, a new monthly publication of the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pennsylvania, appeared recently. The four-page, two-color report contains highlights of Westinghouse scientific research, engineering and production. A feature of the first issue was a story on the Precipitron air-cleaner for removing fly-ash.

According to an announcement from the Mack-International Motor Truck Corporation, J. C. Rowold, the company's vice-president, has been appointed manager of Mack's Pacific Coast Division. Mr. Rowold replaces J. A. Stoner, who recently retired after 28 years of service with the Mack organization.

In accordance with post-war expansion plans of the Eutectic Welding Alloys Company, the firm has appointed John Paul Apron advertising and public relations director.

The Western Precipitation Corporation has announced the removal of its Chicago office to Room 1514, 1 North LaSalle Street, Chicago 2.

Leslie A. Baldwin, vice-president of Johns-Manville Sales Corporation, was honored by his business associates at a luncheon at the Hotel Commodore in New York on May 8 to honor the completion of his twenty-fifth year with the company. In a ceremony after the luncheon Mr. Baldwin was inducted into the Quarter Century Club, an honorary organization of men having been twenty-five or more years with the company.

The Timken Roller Bearing Company has announced the appointment of A. L. Bergstrom as vice-president in charge of engineering.

Trade Literature

The pieces of literature listed below can be obtained direct from the manufacturers named, or requests can be addressed to Pit and Quarry's "Service to Readers" Department.

EUCLIDS. 24 pages. Illustrated story showing Euclids in action on various types of jobs in this country and Europe. The Euclid Road Machinery Company, Cleveland.

DAYBROOK STEEL DUMP BODIES. 4 pages. The Daybrook Hydraulic Corporation, Bowling Green, Ohio.

CATERPILLAR D8 TRACTOR. 32 pages. Form 8869. Shows features of the 113 drawbar horsepower tractor and the Diesel engine that motivates it. Caterpillar Tractor Company, Peoria, Illinois.

SCHNEIBLE WEARPROOF SLUDGE PUMPS. 4 pages. Bulletin No. 1244. The Claude B. Schneible Company, Detroit, Michigan.

PIONEER EQUIPMENT FOR MINES, QUARRIES, GRAVEL PITS. 16 pages. Form 557. Pioneering Engineering Works, Minneapolis 13, Minnesota.

STANDARD DRAGLINE BUCKETS. 8 pages. 112B. Electric Steel Foundry, Portland 10, Oregon.

BLAW-KNOX BUCKETS

Write Bucket Headquarters

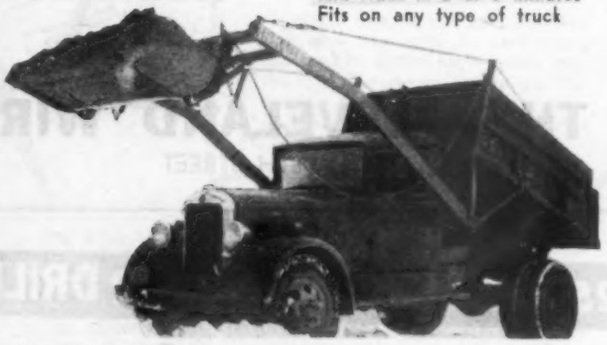
Whatever the job, Blaw-Knox provides a bucket that gets more work done with less crane time . . . Over 100 types and sizes! Write for Catalog 1757.

BLAW-KNOX DIVISION of Blaw-Knox Company
2004 Farmers Bank Bldg., Pittsburgh, Pa.

It Scoops
It Hoists
It Loads

That's the
TRUK-LODER
for quick jobs

Fast as 15 or 20 shovelers
Fills truck in 2 or 3 minutes
Fits on any type of truck



GENERAL UTILITY LOADING DEVICE

TRUK-LODER is especially recommended for contractors and communities. It's the working equal of a large and cost'y shovel in loading gravel, crushed stone, etc. For those requiring a shovel for short intervals, it can be detached quickly by removing two hinge pins and the truck put back into regular hauling service.

Territory open for responsible distributors

Write for Information

TRUK-LODER COMPANY
55 Grace St., TIFFIN, OHIO

CONCRETE
FOR LOW ANNUAL COST

Concrete contractors and concrete products men are saving money for their customers because concrete used for industrial, farm or home improvements is low annual cost construction, the true measure of building economy.

PORTLAND CEMENT ASSOCIATION
Dept. A8-58, 33 W. Grand Ave., Chicago 10, Ill.

For more than half a century, we have been Wheel experts. Our experience includes the designing and manufacture of large Wheels, small Wheels, spoke Wheels, disc Wheels —every conceivable type of wheels for every imaginable type of need.

Let us help you meet your Wheel needs with experienced engineering guidance. Write today for details and Illustrated Bulletins.

EWC WHEELS
Electric Wheel Co., Dept. PQ Quincy, Ill.

SCREEN SERVICE!

RUGGED, DURABLE AND ACCURATE
ALL METALS ALL WEAVES

FOR ANY INDUSTRIAL APPLICATION

THE CLEVELAND WIRE CLOTH & MFG. CO.
3574 E. 78TH STREET CLEVELAND, OHIO

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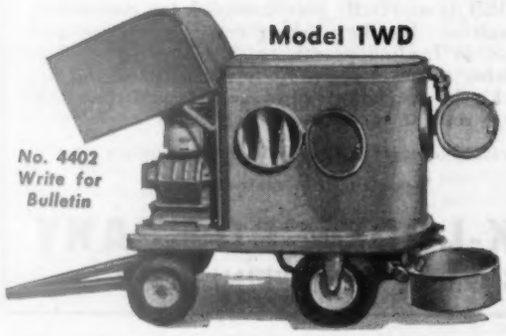
25 to 33 PERCENT *FASTER* DRILLING

MARKLEY-CARTER
PORTABLE DUST COLLECTOR
"Collects and Controls"



No. 4402
Write for
Bulletin

It's defeat day for dangerous and costly dusts on your rock drilling jobs.
This modern protective method

- Reduces silicosis hazard to safe hygienic limits
- Increases drilling speed up to 33%
- Reduces sharpening expense
- Reduces drillsteel wear
- Eliminates wet drilling

Keeps plant, motors, and machinery clean and free from harmful dusts.

RALPH B. CARTER COMPANY
192 ATLANTIC ST., HACKENSACK, N. J. 53 PARK PL., N. Y. 7, N. Y.

Velvetouch
ALL-METAL
CLUTCH FACINGS and BRAKE LININGS
GIVE LONGER, SMOOTHER SERVICE

THE S. K. WELLMAN CO.
1374 East 51st St. Cleveland 3, Ohio

HENDRICK MANUFACTURING CO.
39 Dundaff Street, Carbondale, Pa.
Sales Offices in Principal Cities. Please Consult Telephone Directory.

Write for Catalog 55

COLUMBUS
COMPLETE CONCRETE CONSTRUCTION SERVICE

✓✓ Checks With Producers

. . . because it combines economy and speed in supplying profit-making equipment—anything from just one bucket to a complete plant!

Quarrymen and contractors recommend our full line of screening, crushing, elevating, conveying and transmission machinery.

Some territory open for responsible representatives

THE COLUMBUS CONVEYOR CO., Columbus 8, Ohio

Advertise your
wants and surplus
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PIT AND QUARRY

Keep your Plant at Peak Efficiency with — Continental

IDLERS

A complete line of troughing, Flat Roll or Picking table idlers for belts 14" through 60" wide with steel, cast iron or rubber covered rolls. All idlers equipped with TIMKEN bearings. Also, a complete line of accessories including pulleys, trippers, chutes, take-ups, hold-backs, and belt cleaning brushes.

POWER TRANSMISSION EQUIPMENT

A modern complete line of power transmission equipment including shafting, collars, flexible and rigid couplings, Babbitted and Anti-friction Pillow Blocks, Jaw and friction clutches, pulleys, gears, cast and cut tooth sprockets, roller chain and V-Belt drives. Large stocks are maintained to provide prompt delivery of orders.

INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

Birmingham, Ala.

ATLANTA . . . DALLAS . . . MEMPHIS

Ohio Asphaltic Limestone Co.
NEW VIENNA, OHIO
Davey Compressor Co.
Kent, Ohio
Gentlemen
"It might interest you to know that this unit has been in continuous service for about eight years and the original rings are still in use. We are very much pleased with the year-in, year-out performance of our two Davey compressors."

OWNERS PRAISE LONG PERFORMANCE OF DAVEY COMPRESSORS

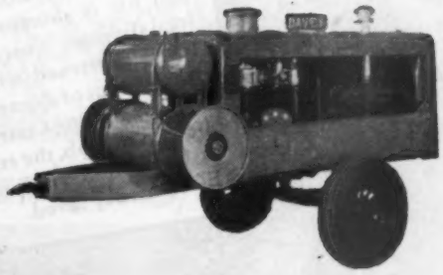
YES, the famous Davey Air Aristocrat trailer compressor receives some of its best advertising unsolicited from highly satisfied owners. It takes long, trouble-free service to produce this type of owner enthusiasm . . . and the high percentage of repeat orders for Davey compressors.

Outstanding performance records of the Davey Air Aristocrat on jobs requiring heavy-duty compressed air production result from its many Davey "plus" features: air-cooled design for greatest efficiency and minimum maintenance; aluminum alloy cylinder heads for maximum heat dissipation; carbon-free stainless steel valves guaranteed for life; conservative speed for low-cost operation and long wear; electrically welded steel frame for ruggedness; automotive-type steering for mobility.

The results of Davey engineering as reflected in Davey Air Aristocrat performance can be summed up in this statement: The Davey Air Aristocrat produces its maximum rated output of air longer—on any type of job—providing greater efficiency of air tool operation; more effective use of manpower; less maintenance cost; less time lost—all adding up to what Davey equipment owners know as Davey long-run economy.

There is a Davey compressor built to bring this Davey economy to most compressed air jobs. For full information on Davey Compressors, Heavy-Duty Truck Power Take-Offs and Pneumatic Saws, write for free catalog E-172.

D-745-6B



DAVEY Compressor Co.

KENT, OHIO

DEALERS IN PRINCIPAL CITIES

EAGLE "Two Punch"

LIMESTONE PULVERIZER and IMPACT BREAKER

Adjustable for Agstone and Roadstone

This EAGLE unit is a real "knockout" for tough crushing jobs, and for insuring extra profits in production.

It furnishes uniformly sized crushed stone for general construction uses, and can be easily adjusted to reduce quarry waste into agricultural limestone.

Economical to install. Low power and upkeep costs. Several sizes available.

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Territory open for responsible distributors

EAGLE

JAW CRUSHERS
IMPACT BREAKERS
PULVERIZERS
CONVEYORS
LOADERS

EAGLE CRUSHER CO., INC., Galion, Ohio

HANSON

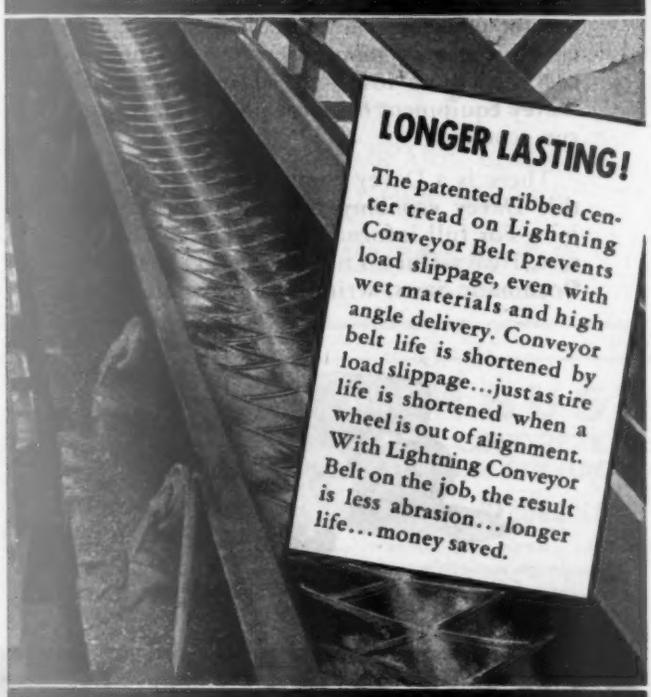
Crawler

EXCAVATORS and CRANES

⅜ and ½ Cu. Yd. Capacity Shovels . . . 4 and 6-Ton Capacity Cranes
Full Revolving—Low Center of Gravity—Rugged Welded Steel Construction—Flexible—Speedy—Safer
Convertible to
Shovel—Crane—Dragline—Pile Driver—Clamshell—Trench Hoe

THE HANSON CLUTCH & MACHINERY CO.
TIFFIN, OHIO

Lightning RIBBED CENTER CONVEYOR BELT

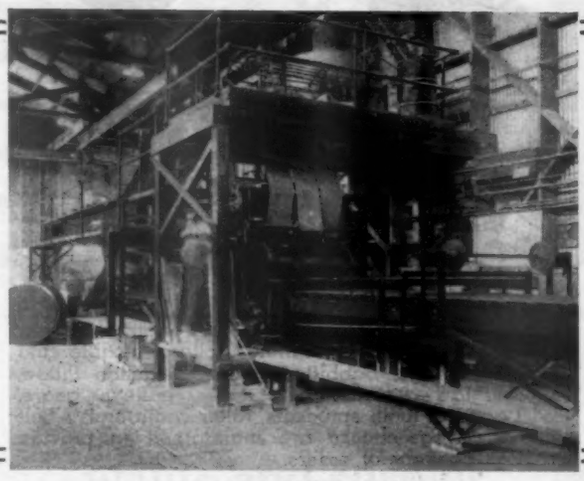


LONGER LASTING!

The patented ribbed center tread on Lightning Conveyor Belt prevents load slippage, even with wet materials and high angle delivery. Conveyor belt life is shortened by load slippage...just as tire life is shortened when a wheel is out of alignment. With Lightning Conveyor Belt on the job, the result is less abrasion...longer life...money saved.

The AMERICAN RUBBER Mfg. Co.
PARK AVENUE AND WATTS STREET · OAKLAND 8, CALIF

EHRSAM Equipment
Preferred for Producing
GYPSUM Wallboard



EHRSAM BOARD MACHINE
Forming and Palette Section

EHRSAM furnishes a complete line of specialized equipment for making gypsum wall board and plaster lath.

EHRSAM modern design machines provide for all phases of material handling and processing operations. Write for engineering information.

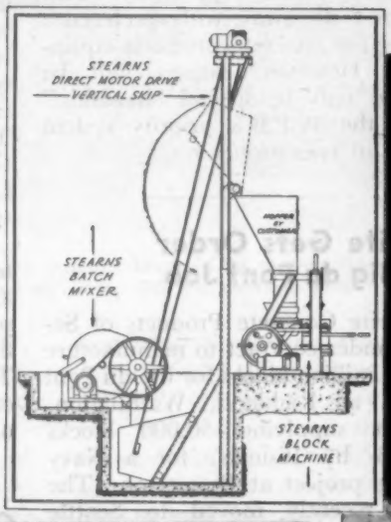
THE J. B. EHRSAM & SONS MFG. COMPANY
ENTERPRISE, KANSAS

August, 1945

The CONCRETE MANUFACTURER

A Special Section of...

Fourth "E" awarded
March 10, 1945



Typical Skip Loader installation with mixer at floor level.

STEARNS SKIP LOADERS

Speed Production

- **OUTSTANDING FOR ITS LABOR SAVING EFFICIENCY** in modern concrete products plants, the Stearns Skip Loader illustrated here is readily adaptable to almost any type of plant layout.
- **MACHINE-FLOOR LEVEL** operation and control is achieved by using this fully mechanized unit for conveying fresh concrete from mixers to machine hoppers or for hoisting dry materials to elevated mixers or to storage bins.
- **PUSH-BUTTON CONTROL** starts bucket up or down. It automatically stops when dumped and when it returns to the bottom. Other controls permit bucket to be stopped in any desired position.
- **EASILY INSTALLED AS A SEPARATE UNIT,** it may be used with any type of mixer. Independent gearhead motor drive (illustrated above) or mixer-driven type can be furnished. Track may be vertical or at any desired angle, permitting a wide range of application.

Our new Skip Loader folder illustrates three installation methods. Write for your copy today.

Performance Speaks Louder than Words

ASK ANY STEARNS OWNER

A FEW OF HUNDREDS

UNIVERSAL PIPE CO.
Columbus, Ohio
Four Skip Loaders

CINDER BLOCK CO.
Richmond, Virginia
Three Skip Loaders

ELK RIVER CONCRETE PRODUCTS CO.
Billings, Montana
One Skip Loader

STEARNS

GENE OLSEN, PRESIDENT

Designers and manufacturers of vibration and tamping-type block machines
● Mixers ● Skip Loaders ● Licensed under the basic Gelbman Vibration Patents

The CONCRETE MANUFACTURER

August, 1945

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W.P.B. Revokes Rules Requiring Rating For New Machinery

By action of the War Production Board, Limitation Order L-123 was revoked, making it unnecessary for the purchaser of concrete products machinery to present a preference rating to the manufacturer. The latter now will choose buyers whom they wish to serve promptly. This does not do away with preference ratings for concrete products equipment. However, ratings will be granted only in special "hardship" cases; the W.P.B.'s priority system is still in operation.

Layrite Gets Order For Big du Pont Job

Layrite Concrete Products of Seattle, under contract to manufacture several million blocks for the du Pont project at Richland, Washington, now is supplying 50,000 blocks (8-by-8- by 16-inch) for a Navy housing project at Bremerton. The plant, recently moved to Seattle from Richland, has a capacity of 14,200 standard-size concrete blocks per day and 120,000 concrete bricks per day.

California Firm Plans Combined Operations

The American Lumber Company of Modesto, California, is planning a new combination concrete-products and ready-mixed-concrete plant with construction slated to begin in the near future, according to Ian Mensinger, company official. Storage and batching facilities will serve both the block-manufacturing and transit-mix departments.

Special Brikcrete Rights Granted Western Concern

The Brikcrete Company of Grand Rapids, has granted to James Lundgren of Vancouver, Washington, a franchise for the sole manufacturing and selling rights of its concrete blocks in certain counties in Washington and Oregon. Mr. Lundgren represents Pacific Concrete Products, reported to be operating the only plant of its type west of Denver.

New Method Devised for Making Concrete Planks

A unique method of making concrete planks has been developed by the Cities Fuel & Supply Company of West Allis, Wisconsin. Lightweight insulated blocks are joined into any desired lengths by reinforcing rods. Insulating blocks are dipped in cement and laid face to face. They are pulled together by central tie rods and reinforced with piping. During the grouting the rods are twisted to insure a good bond.

Planks made with 4-inch units, tested for a 10-foot clear span, gave an equivalent uniform load of 133 pounds per square foot when the deflection became 1/360 of the span. The yield point and ultimate failure came at an equivalent uniform load of about 330 pounds per square foot.

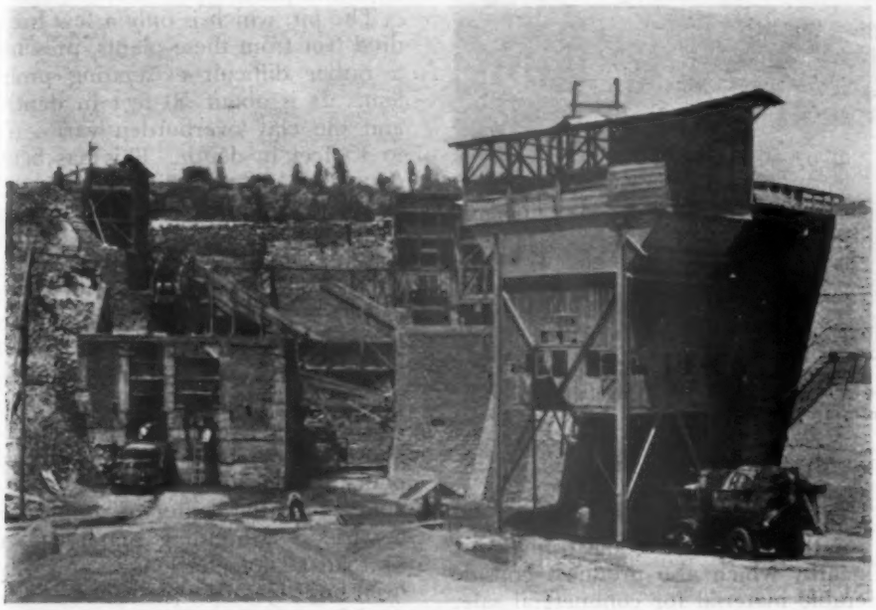
Concrete Blocks Used To Pave River Bottom

United States Army engineers are supervising an attempt to tame the whirlpools of the Mississippi which so often dig holes in the river bottom or undermine protecting levees. At a point near Baton Rouge, Louisiana, they are filling holes and attempting to make the river bottom level by covering it with concrete blocks. Units from the George W. McDearmon plant are hauled by barge to the river bank, to be "sown" from barges which ply to and fro across the stream. Divers check the results at various points.

Pettit & Weiler Plant To Open at Sequim, Wash.

The organization of the Sequim Concrete & Products Company has been announced by M. N. Pettit and J. H. Weiler of Sequim, Washington. The partners have acquired the rights to a gravel pit and have set up equipment for the manufacture of concrete building blocks.

Unique Ready-Mix Plant in Mexico Is Profitable, Self-Sustaining Unit



View of Concretos Cientificos, Arbide, S. A., Mixcoac, Mexico City, showing three aggregate crushing, screening and washing plants and the concrete plant.

another ON THE SPOT report

WHEN, in the June, 1942, issue of PIT AND QUARRY, an article was published describing the new ready-mixed concrete plant of Concretos Cientificos, Arbide, S. A. in Mixcoac, a suburb of Mexico City, I was intrigued by the apparent inconsistency of such a modern operation in a country with low labor costs and a low standard of living for most of its population. As a result, on a recent trip through Mexico, I dropped in at this plant to see how this pioneering venture had worked out, half expecting to find it defunct. On the contrary, I found that this plant had all the business it could handle, and that steps were being taken to increase its capacity and to add new lines to the company's business. As far as I could determine it is still the only commercial ready-mixed concrete plant in Mexico and its product is being sold on a strength basis in competition with job mixing of the most primitive type.

The guiding spirits behind this seemingly daring venture I found to be a charming couple, Senor and Senora Nicanor Arbide, possessed of all the old-world graciousness and courtesy commonly believed to belong only to the romantic past. In spite of some linguistic difficulties—Senor Arbide speaks only Spanish, Senora Arbide only Spanish and French, and my knowledge of these two languages is strictly of the wine and dine variety—I soon learned of the outstanding improvement program now under way. Mrs. Trauffer acted as French interpreter and Superintendent Erdman's smattering of English also helped.

By W. E. TRAUFFER

Senor Arbide had for many years been a contractor and producer of concrete pipe when he got the idea of building a modern plant to supply concrete not only for these operations but also for commercial sale. After looking over the industry in the United States he selected the Butler plant with the (SC^2) system of control which was described in the above mentioned article. This plant has kept the original fleet of seven Jaeger-Autocar truck mixers busy supplying concrete for Senor Arbide's street and highway paving contracts, for sale to others doing similar work and for a growing amount of building construction. In order to meet the growing demands of the

The three aggregate plants, concrete plant and, in the background, a part of the concrete pipe plant and yard.

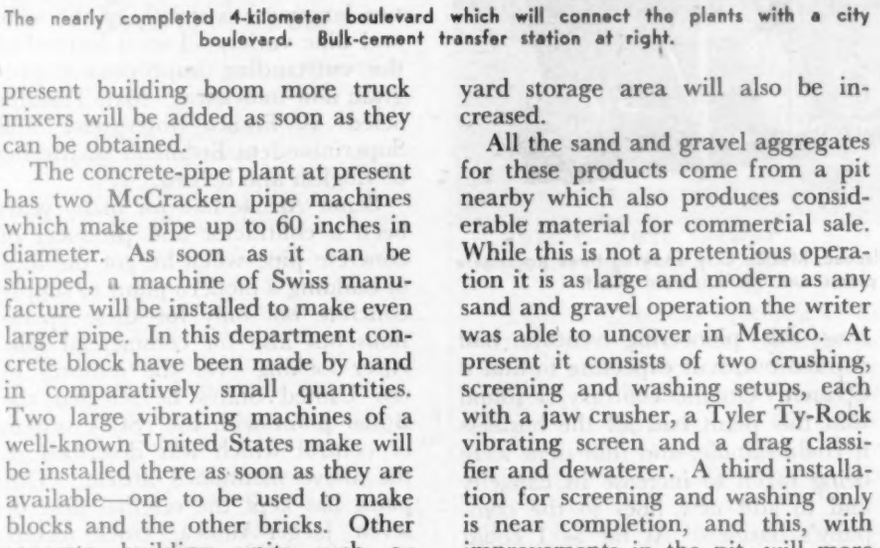
Left to right: Senora Arbide, Mrs. W. E. Trauffer, Senor Arbide and Superintendent Erdman.

The nearly completed 4-kilometer boulevard which will connect the plants with a city boulevard. Bulk-cement transfer station at right.

present building boom more truck mixers will be added as soon as they can be obtained.

The concrete-pipe plant at present has two McCracken pipe machines which make pipe up to 60 inches in diameter. As soon as it can be shipped, a machine of Swiss manufacture will be installed to make even larger pipe. In this department concrete block have been made by hand in comparatively small quantities. Two large vibrating machines of a well-known United States make will be installed there as soon as they are available—one to be used to make blocks and the other bricks. Other concrete building units such as joists, etc., will also be made. The yard storage area will also be increased.

All the sand and gravel aggregates for these products come from a pit nearby which also produces considerable material for commercial sale. While this is not a pretentious operation it is as large and modern as any sand and gravel operation the writer was able to uncover in Mexico. At present it consists of two crushing, screening and washing setups, each with a jaw crusher, a Tyler Ty-Rock vibrating screen and a drag classifier and dewaterer. A third installation for screening and washing only is near completion, and this, with improvements in the pit, will more than double the present producing capacity. The various-sized products are stored in concrete-walled side-hill bins from which they are loaded by gravity into trucks for delivery or to stockpiles. A Barber-Greene stockpile loader is used to reclaim from the piles.



View of gravel pit, showing manner in which material is being shot down by tunneling under overburden.

The pit, which is only a few hundred feet from these plants, presents a rather difficult excavating problem. It is about 50 feet in depth, and the clay overburden varies up to 15 feet in depth. This has been removed by tunneling under it, blasting it down, and removing it with shovels and cranes. This method is now being abandoned with the advent of a larger shovel which will load the overburden direct in the manner customary in the United States. A new and larger loading shovel is also being added in the pit.

All these seemingly individual expansions are parts of a well-integrated plan to make this pit and its dependent plants the center of supply for a variety of building materials. A railroad 1 kilometer long has already been built from the plant of Cementos Mixcoac, S. A., in suburban San Pedro de Los Pinos to a bulk-cement transfer station near the plants. Bulk cement has been hauled in trucks to the concrete and pipe plants, but the new setup will also be used for bulk sales in trucks to local users. The bulk-cement railroad cars are owned by the company, and the switching locomotive is owned by the cement company, making this system independent of the existing rail transportation difficulties.

Paralleling the railroad for some of its length is a 4-kilometer private boulevard near completion which will connect these operations with one of the main boulevards radiating from the center of Mexico City. According to Senor Arbide this boulevard will make it possible for trucks to deliver a load of concrete sand and gravel, blocks, pipe, etc., about 5 miles to the Zocalo, the famous square in the heart of the city, in 10 minutes. Other parts of the city will be equally accessible. In establishing the right-of-way for this highway houses were moved and a railroad underpass and culverts had to be built. This highway is also intended to develop this area by encouraging new manufacturing industries to locate along it on property owned by Senor Arbide.

Offices and workshops of the Miami Concrete Products Company were recently opened at Miami, Oklahoma. John I. Sage is the owner and operator of the concern.

Texas Plant Finds Jobs for Employees By Developing New Line of Products

General view of the Austin Concrete Works, showing part of the 3-acre pipe storage yard.

another ON THE SPOT report

THE Austin Concrete Works, Inc., of Austin, Texas, affords an excellent example of the extent to which many concrete products firms have diversified their production in the past few years. This firm started business in 1924 as the Water Seal Roofing Tile Company, and the present name was adopted in 1926 when it was decided to concentrate production on concrete pipe. When the huge war-inspired demand for concrete pipe had passed its peak and was unmistakably on the downgrade, this concern, like many others, was confronted with the problem of largely disbanding its organization or finding other work with which to supplement the relatively small volume of pipe which could be produced and marketed. The perseverance and ingenuity which were invested in the solution of its problem have resulted in the development of several new products which will undoubtedly remain in production long after the pipe market has been restored, and will serve in the post-war period to stabilize plant operations and employment to an extent undreamed of before the war.

With an eye to the growing farm market for blocks, about a year ago the company had special mold boxes made in order to produce masonry units on an existing packer-head pipe machine of its design. This hydraulically-operated machine produces an 8- by 8- by 16-inch unit with a 6-inch cylindrical core and two 2- by 4-inch hand holes in opposite faces. Two 16-inch units, or two 8-inch and one 16-inch, are produced simultaneously, and within a month of placing the machine in operation a production of 1,000 units in 8 hours had been attained. The

By WILLIAM M. AVERY

first blocks produced tested 600 pounds per square inch at 7 days, and showed an absorption of 7.25 pounds per cubic foot and a moisture content of 36.2 pounds.

Both gas-meter and water-meter boxes are being successfully produced as more-than-acceptable substitutes for the cast-iron boxes formerly used in Austin. The 18- by 20- by 15-inch deep gas meter boxes are produced at the rate of 30 units per day by a 2-man crew. The dry concrete mix is thoroughly tamped in the single all-steel form which can be pulled immediately in preparation for making the next unit. The 20-inch diameter by 13-inch deep water-meter boxes are produced at the rate of 50 units per day by a 2-man crew; these are also hand-tamped and the forms are pulled immediately.

The company produces stock watering troughs in several sizes ranking in capacity from 40 gallons to 6½ barrels. These units are reinforced and are equipped with bolts for the installation of float valves. Among the miscellaneous items for which there is an almost continuous demand are well-curbing sections, well covers and paving blocks. It should be noted particularly that the production of these items has been taken over without any large outlay of additional capital for new machinery or equipment, nor has the plant's main business of manufactur-

The 9-cubic-foot mixer which furnishes concrete for general purposes throughout the Austin Concrete Works, Inc., plant.

ing concrete pipe been hampered or jeopardized in the slightest degree. With very minor changes or adaptations, the available floor space and manufacturing facilities have served admirably for the various new prod-

This pipe machine, designed to make up to 42-inch diameter pipe, now makes up to 60-inch, using outriggers.

ucts which have been developed. The company advertises that its plant is equipped to make anything in concrete, and urges its customers to write in about their problems, with the promise that a solution will be found if concrete is suitable.

Until 1937 the Austin Concrete Works produced pipe ranging in diameter from 4-inches to only 30-inches; in that year a general program of expansion was undertaken and the present 80- by 180-foot plant building was erected on a new site and equipped to make pipe up to 60 inches in diameter. Colorado River sand and gravel and a fine material called "blow sand" are trucked to the plant from the Robinson Sand & Gravel Company, a distance of about ¼ mile, and stockpiled in ground-level concrete bins adjoining the building. From 10- to 15-cubic yards each of sand and gravel can thus be stored adjacent to each of the 3 mixers—a 9-cubic-foot Ideal, a 12-cubic-foot Tuerck-Mackenzie and an 18-cubic-foot Dodson-McCord machine. Wheelbarrows are used for transporting the materials from the stock piles to the mixers.

Bagged cement, which is ground fine enough to pass a high-early-strength test, is purchased by the carload and stored under roof. The water addition is made through ½-inch perforated pipes located over each of the mixers, the amount being determined wholly in accordance with the operators' judgment. Three pipe machines are in operation at present. A Tuerck-Mackenzie No. 3 machine originally built to manufacture up to the maximum of 42-inch diameter pipe, has been redesigned to make up to 60-inch, using outriggers and moving out the 50-inch table. A Smith No. 2 tamper machine makes up to 24-inch diameter pipe at the rate of about 35 tons in 8 hours. The third unit, a packer-head machine built to the company's own specifications, has a capacity of about 25 tons in 8 hours, and makes up to 12-inch diameter pipe. The two larger mixers feed to the Tuerck-Mackenzie and Smith machines by means of belt conveyors.

The plant's pipe production falls primarily in the 4- to 24-inch diameter range, with 6-inch predominating to the exclusive use of this size for laterals by the city of Austin. For storm sewers and drains the big sellers are 15-, 18- and 24-inch, and the company normally does not make larger sizes except for special storm-sewer jobs. All pipe from 12 inches up in size produced for the Texas State Highway Department is reinforced; for city work reinforcing starts at the 30-inch size.

Rubber-tired hand buggies are used for handling units up to 36 inches in diameter, while the larger-diameter pipes are handled with a plant-built hydraulic-jack lift truck. In order to obtain peak production for the many war projects in the vicinity of Austin, the company installed numerous drop curtains and for a time used steam to expedite the curing of pipe. Under normal conditions there is adequate storage

Completed masonry units produced on the company-designed packer-head pipe machine. Note hand holes and cylindrical cores.

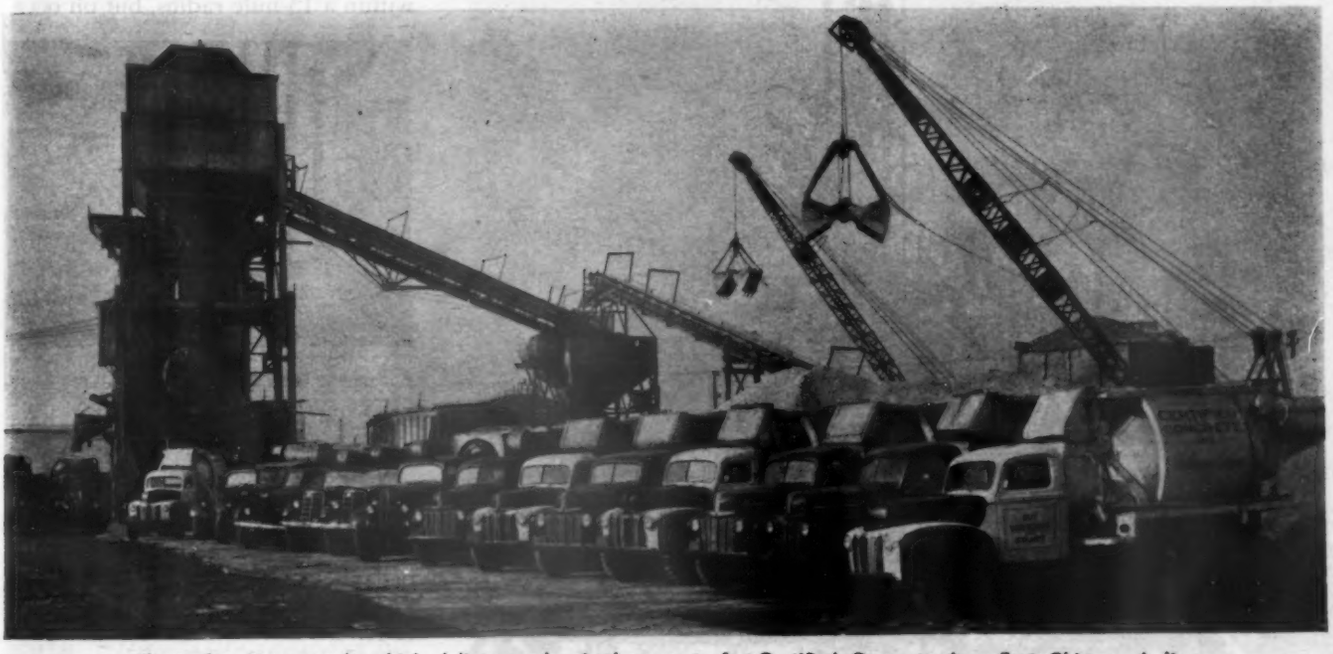
space under roof for about 5 days production, and the customary procedure is to cure with hand spray-

(*Continued on page* 124)

Hand-tamped gas meter boxes are produced at the rate of 30 units per day; require only one form and a 2-man crew.

Some of the stock watering troughs which this company makes in order to give employment to key men.

Custom-Made Concrete a Specialty Of Plant Designed to Suit Customers



Fleet of agitator trucks which deliver ready-mixed concrete for Certified Concrete, Inc., East Chicago, Indiana.

another ON THE SPOT report

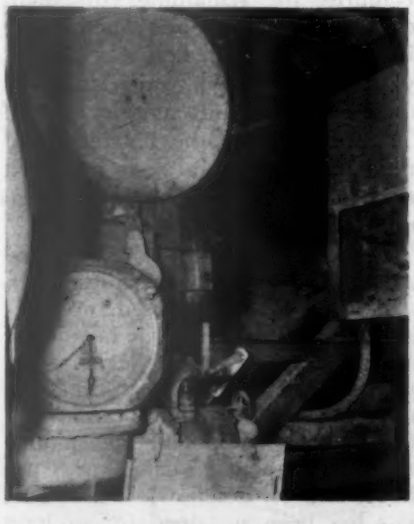
LOCATED in the heart of one of the world's great industrial sections, Certified Concrete, Inc., East Chicago, Indiana, operates a central mixing plant which was designed wholly to meet the rigid specifications of its customers. Transit-mixed deliveries were abandoned by this concern late in 1937 in order to obtain more precise control and timing of the mixing operation and to achieve the closest possible adherence to the customers' specifications. The plant is, therefore, of more than usual interest in that its design reflects to a considerable extent the consensus of ideas and suggestions advanced by engineers representing several of the larger industries in the area served.

All materials are brought to the plant by railway. The Butler 300-barrel cement bin is serviced by the conventional under-track screw conveyor and bucket elevator, and the aggregates are dumped from hopper-bottom cars into concrete storage pits or loaded by a clam shell crane directly into a hopper which feeds the plant. A Northwest 104 crane with a 1¼-cubic-yard bucket is normally used for handling materials, but a 204 unit of the same make is also used during periods of peak operations.

Two Barber-Greene belt conveyors, with an intermediate 2-compartment Butler bin for dry batching, are used for elevating aggregates to the main batching plant. From the

By WILLIAM M. AVERY

loading hopper adjacent to the storage pits, a 24-inch by 145-foot conveyor can feed the small dry-batching bin or discharge onto a 30-inch by 74-foot conveyor which supplies the 3-compartment 100-ton bin of the central-mixing plant. A separate boiler house adjacent to the bins houses a 100-horsepower Combustion Engineering semi-portable coal-fired boiler which is used for heating aggregates and water during the winter months.

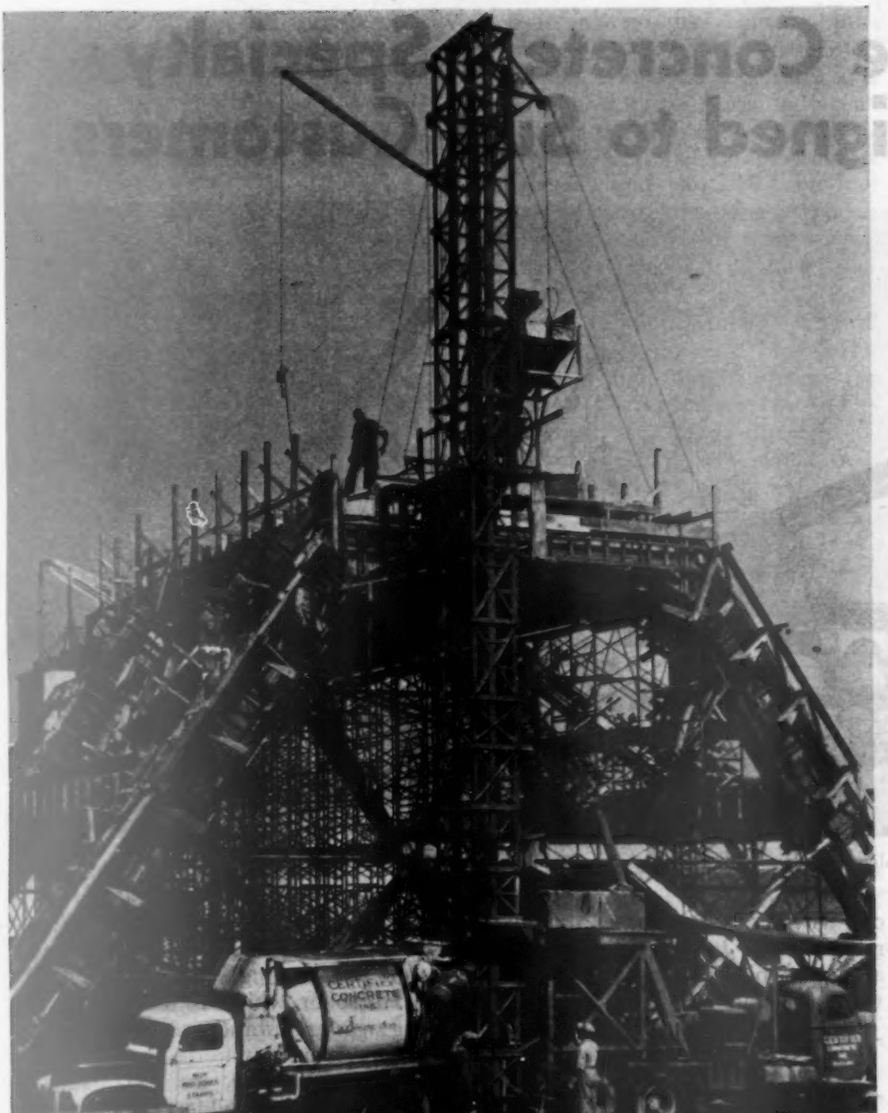


Control equipment in the batching plant. Above: Mechanical dispenser for cement-dispersing agent. Below: Water meter.

The company in 1937 started using Master Builders' cement-dispersing agent, Pozzolith[1], in the dry form, and about a year ago installed automatic dispensing equipment for introducing liquid Pozzolith into the mixes. Either standard or high-early-strength Pozzolith solution is made up in a 500 gallon tank located in the boiler room and is pumped automatically to the dispenser located on the batching floor. The proper amount of solution is introduced into the mixing water by simultaneously tripping the push-button control on the dispenser and opening the valve in the mixing-water line, the required amount of water for the mix having previously been measured through a 1½-inch Neptune meter into an 84-gallon tank.

Increasingly the company's customers tend to specify the use of Pozzolith, and during the current year it is anticipated that 30 to 35 per cent. of the plant's total output will contain this cement-dispersing agent. When it is required to meet a

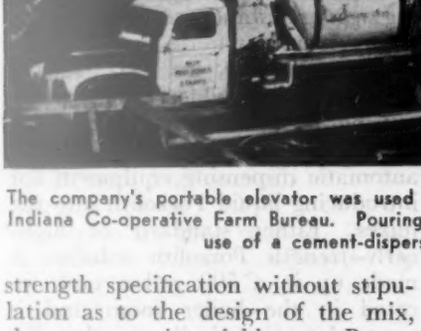
[1][See: Avery (William M.). *Ready-Mix Company Reports Benefits Gained by Use of Cement Dispersing Agent.* PIT AND QUARRY, June, 1945, p. 99.—ED.]



The company's portable elevator was used in pouring forms for a fertilizer plant for the Indiana Co-operative Farm Bureau. Pouring of these intricate bents was facilitated by the use of a cement-dispersing agent in the concrete.

strength specification without stipulation as to the design of the mix, the company invariably uses Pozzolith.

Except for the water, which is metered, all the materials are weigh-batched. An automatic cement weigher and a Butler 3-beam scale comprise the remaining equipment on the batching floor. The mixing is done in a Chain Belt Rex 2-cubic yard machine from which the concrete is spouted into agitator trucks. The controls for the batching and mixing operation are so arranged that one man can readily manage the entire plant.



Mixing is done in a 2-cubic-yard mixer which discharges concrete into agitator trucks.

Fifteen Rex 4- and 4½-cubic yard agitators, mounted on White, Mack and Ford trucks, are used for making deliveries. The Fords have been equipped with Thornton rear ends to assure deliveries under even the most adverse road conditions. With the present equipment the plant's capacity is about 95 cubic yards per hour, and on defense jobs this output has been sustained for as long as 24 hours. (It should be apparent that little more than shrink mixing could be accomplished at this rate.) The all-time-high production rate was achieved in 1942, at the peak of the defense construction boom, when the plant delivered 2,740 cubic yards of concrete in a 23½-hour period. In general, deliveries are made within a 15-mile radius, but on occasion the company's trucks have hauled up to 35 miles.

A 3-beam scale weighs the solid materials.

Certified Concrete, Inc., operates one of the few Moto Hopper Towers made by the Chain Belt Company before acute material shortages stopped their production. The equipment consists of a 60-foot hinged tower mounted on a truck and supported, when in transit, by a frame over the truck cab. On the job the tower is raised to the vertical position to provide the track and support for a ⅝-cubic-yard elevating hopper. The hopper is loaded directly from the delivery truck at the bottom of the tower and elevated to the required pouring level by means of a separate drive mounted on the truck frame. The equipment is rated at 30 cubic yards per hour.

J. T. Gaither, president, and G. H. Maywald, secretary.

J. T. Gaither is President, Eva S. Gaither, Treasurer, and George H. Maywald, secretary, of Certified Concrete, Inc.

New Concrete-Products Plant Built To Supply Los Angeles Building Needs

Plant building of the Los Angeles Block & Brick Company, with aggregate bins above.

By HARRY F. UTLEY

another ON THE SPOT report

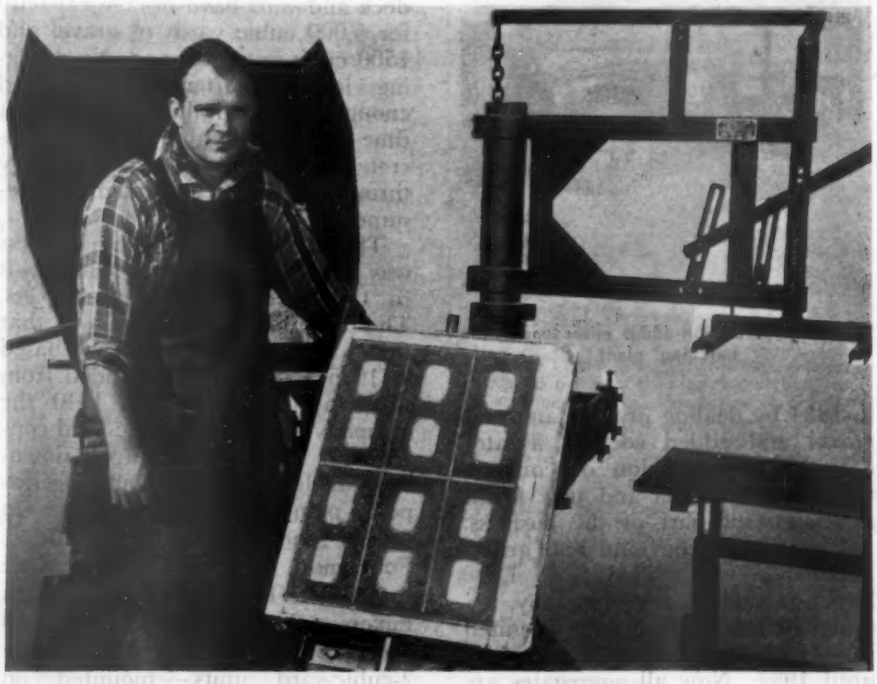
IN the expectation that the building boom which struck the Los Angeles area with the advent of war will continue well into the decades of peace, a new concrete-products plant has just been opened in the South Gate district by the Los Angeles Block & Brick Company. While South Gate is predominately an industrial community, serving the big West Coast tire plants of the big Akron rubber companies, it also has large, rapidly-growing residential sections to house these workers and commuters to downtown Los Angeles. Many of the industrial concerns contemplate important construction programs in the post-war period and several big eastern manufacturers are reported planning to build Pacific Coast branch plants there. In fact, South Gate's prospects looked so rosy to the members of the new concrete-products firm, Santo Tedesco, his son, Frank, and Dominic Amato, that the site for the new plant was chosen near the important and centrally-located intersection of Atlantic and Firestone Boulevards.

Equipment in the new plant, which began operations in March, 1945, includes a Flam vibration machine for producing the units and a 30-cubic foot Besser batch mixer. Aggregates—pea gravel, and a blend of concrete and plaster sand — are purchased and discharged by dump trucks on arrival into two 20-ton concrete storage bins below ground level. A 45-foot belt-bucket elevator reclaims these materials, admitted into the elevator boot by hand-operated gates, and carries them up to a 2-compartment overhead steel plant bin. A turnhead controlled from the ground diverts the material into the proper compartment. Beneath this bin and above the mixer a 2,400 - pound - capacity batching box is used to measure out the sand and gravel in proportions, by volume, of about 65 and 35 per cent. respectively. Cement is added from sacks after the aggregate batch is dumped into the mixer.

After mixing the concrete is discharged into a hopper which feeds the material as required into the molds of the block machine. Presently bricks and 4- by 6- by 12-inch and 4- by 8- by 12-inch 2-core tiles are being manufactured. Four 8-inch units, six 6-inch units, or 18 bricks are cast in a single operation, the mold being up - ended and stripped separately after being hoisted from the vibrator. The machine, which compacts the units by unidirectional vibration, a patented Flam feature, is the latest model "Challenger" now in production at the Stephen Flam machine shops in Van Nuys, California.
stoves.

The freshly - made units are stacked, five tiers on wood pallets, on steel flat-cars operating over a 24-inch gage track. A transfer car, on 6-foot-gage rails, switches them to the unloading aisles in the storage

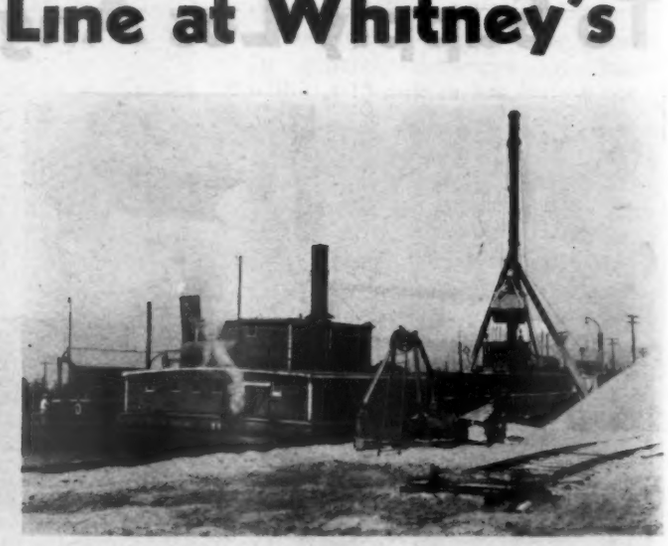
(*Continued on page* 124)



Close-up view of vibration machine showing how mold is upended for stripping.

Ready-Mixed Concrete Venture Becomes Featured Line at Whitney's

General view of Whitney's yard and dock at Duluth, Minnesota, showing ready-mix batching plant (right) and barge unloading (background).



Barge-mounted clamshell derrick unloading sand to the dock at Whitney's, Duluth, Minnesota.

another ON THE SPOT report

ALONG the shores of the Great Lakes are located many docks operated by coal dealers who now also handle sand and gravel or crushed stone and most of whom have in recent years added ready-mixed concrete as a sideline. Whitney's of Duluth, Minnesota, fit into this picture except that they began

A 2-cubic-yard high-dump mixer under the batching plant.

in 1884 by dealing first in sand and gravel and added coal at a later date. The production of concrete was begun in 1933 and now forms an important part of the business.

Up to 1928 the sand and gravel handled were dredged from Lake Superior. Then the company acquired a land deposit and operated its own crushing and screening plant until 1937. Now all aggregates are purchased. The gravel is trucked from a local plant and the washed and screened sand is received by railroad from a more distant plant. Fine lake sand for blending and coarse Apostle Islands' sand for engine and

By W. E. TRAUFFER

plastering are brought in on scows of a 700-cubic-yard capacity. The unloading of the barges is done by clamshell derricks mounted on them which also do the loading at the deposits. In addition to the coal the dock and yard have storage capacity for 5,000 cubic yards of gravel and 1500 cubic yards of sand. No dredging is done after October, and enough storage is built up by that time for 10,000 cubic yards of concrete, which is enough to carry through the winter. Dredging is resumed about May 1.

The ready-mixed concrete business was started on an experimental basis in 1933 with rented truck mixers. The trade response was so good that three truck-mixers were purchased in 1935 and more were added from time to time. When in 1940 the company got a 7,000-cubic-yard contract for sewage tunnels from downtown Duluth to a new outlying disposal plant, its largest contract up to that time, two mixers were added. Four more have been added since that time. The fleet now totals ten mixers — 2 Chain Belt Rex and 8 Jaegers, including 4 high-discharge 2-cubic-yard units — mounted on Ford and International chassis.

This job, started on December 1, 1940, was the first large winter pour made in that area. Its success led to other large winter jobs which could be poured without interfering with the seasonal shipment of iron ore, the major industry. In the Fall and Winter of 1942 a 4,500-cubic-yard round-house was poured for the Duluth, Missabe and Iron Range Railway at Proctor from a portable setup. In the late Winter and Spring of 1943 7,000-cubic yards was supplied from the main plant for the foundations, slab and railings of a new bridge for a large coal and dock company in Superior, Wisconsin. A similar 2,000-cubic yard job in Duluth carried over into 1944. Also in the winter of 1943-44 2,000-cubic yards was provided from the portable setup for a culvert and dam for the Lake Mining Company at Biwabik, Minnesota. Next was

High-lift truck-mixer, with Alex Selgren, driver, and Albert Carlson, batchman.

a 1,500-cubic-yard contract in Superior for paving between a coal dock and a large briquetting plant. Late in 1944 a 2,000-cubic-yard contract was started for casings around the footings of a bridge at Doylston, Wisconsin, an 18-mile haul one way from the plant.

In addition to these large jobs many smaller orders are received for engine pits, round-house floors, cinder pits, and similar work. Much concrete has also been sold to the many shipyards in this area, most of which have been built since the war began. There has been some city and state paving but little private demand. The post-war business, however, is expected to come largely from paving and housing, of which there is a large backlog.

Before the company's first winter

Left to right: E. K. Brown, general manager; Joe Wajtesky, dispatcher; Clarence Vallie, superintendent.

pour practically no cold-weather concreting was done in this area. A tribute to the company and the industry is the fact that the state highway department uses Whitney's concrete in cold weather but will not allow contractors to pour from their own mixers in the same weather. Winter pours are usually made down to about 0 degrees F. but some, like the Biwabik job, were poured in temperatures down to —20 degrees F.

The mixing water is steam tempered to 70 to 80 degrees F. in cold weather, the aggregates are heated, and high-early-strength or other quick-setting cements are used. Calcium chloride is sometimes added. Doroplastic cement is used only in slabs to prevent scaling. The only other precaution found necessary is the use of salamanders and canvas on the job.

The main stationary batching plant at the dock, which had been used for many years, was replaced in 1941 with a 75-cubic-yard, 3-compartment Butler bin and a 2-cubic-yard Butler weigh batcher. The aggregates are handled by a 15-ton locomotive crane which does all the yard handling. Bagged cement is received in trucks and is carried on a belt-conveyor to the batching floor where it is dumped direct into the mixers. The live steam for winter operation comes from a 60-horsepower boiler. It is used to heat the mixing water and also heats the aggregates by means of coils in the bins. This steam is used in warm weather to lay the dust on the coal piles.

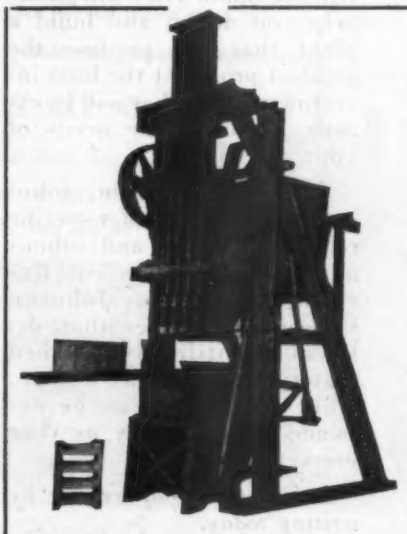
This business was founded by Gwin A. Whitney, president of the Merritt, Chapman & Scott Corporation, large salvage engineers and contractors on underwater construction, who operated it as a sideline until his death in February, 1939. E. K. Brown is general manager in charge of all departments and is assisted by A. E. Korseberg. Clarence Vallie is superintendent.

The Heston Concrete Company of Indianapolis has announced the appointment of J. F. Gates as sales manager. Mr. Gates was for 19 years with the Lone Star Cement Corporation.

● These 3 standardized sizes of Erie general purpose Portable AggreMeters are serving all parts of U.S.A. In writing for data, refer to size required: GA 36 yd. or 54 ton
GA 52 yd. or 78 ton
GA 68 yd. or 102 ton

ADDRESS: 658 GEIST RD.

ERIE STEEL CONSTRUCTION CO.
ERIE, PENNSYLVANIA
AggreMeters • Buckets • Concrete Plants • Traveling Cranes



An All-Purpose Machine

The Junior Stripper will turn out more blocks per man than any other hand-operated machine on the market . . . 200 per hour being easily maintained! Nor has quality of output been sacrificed for the sake of speed. Units are uniformly dense, true to shape, of uniform texture.

Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers and Joltcrete, Stearns mixers, and Cast Iron and Press Steel pallets, Straublox oscillating attachments, etc. Repair parts for: Anchor, Ideal, Universal, Stearns, Blystone mixers and many others.

ANCHOR CONCRETE MACHINERY CO.
G. M. Friel, Manager — Columbus, Ohio

A Ready-Mix Concrete Plant That Will Show TOP Profits

Johnson engineers know the ins and outs of concrete mixing—in large quantities or small. They will gladly help you design and build a plant that will produce the greatest profits at the least investment—one that will be exactly fitted to the needs of your market.

Without obligation, Johnson engineers will offer specific recommendations and submit a proposed plant layout featuring the famous Johnson Concentric Batcher that delivers scientifically batched material as you need it . . . This equipment can be expanded economically as your market grows.

Invite this cooperation by writing today.

Also ask for facts about Johnson's Clamshell Buckets available in three types—Rehandling, General Purpose and Heavy Digging—a size for every need.

The C. S. JOHNSON Co.
Champaign, Illinois
Koehring subsidiary

Austin (*from page* 118)

ing only. After 5 days the units are moved to the 3-acre storage yard where they are kept for at least 4 weeks before being shipped. During hot, dry periods the pipes in the yard are sprayed periodically.

Due to the present slump in the demand for concrete pipe only 10 men are required to carry on operations, compared with twice that

H. D. Graves, plant superintendent.

number employed before the war. But the significant fact is that these 10 men have had reasonable continuity of employment and that their skill and "know-how" will be immediately available when the inevitable post-war construction boom commences. To this extent the Austin Concrete Works, Inc., has weathered the war years with its most important asset held intact, and with a world of rich experience in tapping the diverse markets open to all aggressive and imaginative producers in the concrete-products field.

H. H. Dickehut is general manager of the company and H. D. Graves is superintendent of the plant.

New Concrete (*from page* 121)

yard, where the units are allowed to cure in the open with the benefit of frequent sprinkling.

Operator at the vibration molding machine. Stripper and hoist at right.

electrically operated, a 20-horsepower Westinghouse motor driving the mixer through Dayton Cog-Belts.

Santo Tedesco, who heads the

Hoisting a pallet-load of freshly made units to one of the cars.

All the equipment in the plant is concern, also actively manages the plant. Before launching the new venture he was for many years engaged in road building and the trucking business in southern California.

Kansas Plant Foreman Killed by Sand Slide

Odis L. Patterson, foreman of the United Cement Products Company at Wichita, Kansas, died of suffocation when tons of sand covered him in the metal pit of a concrete-mixing machine. The victim had entered the pit to dislodge damp sand from the sides, and had been caught by the slide after losing his hold on a rope fastened to the top of the pit.

Apologies to L. C. L.

In the description of the operations of the Valentine Concrete Company at Springfield, Massachusetts, published in the May issue of the *Concrete Manufacturer*, pp. 157-159, full credit was not given the manufacturer of the L.C.L. container system in use there. This is the L. C. L. Corporation system of bulk-cement handling brought out in conjunction with the Kennedy-Van Saun Manufacturing & Engineering Corporation and all the equipment used is the property of the L. C. L. Corporation and is operated under lease by the railroads mentioned. The corporation also originated the use of an additional container to transfer the cement from the plant-storage silo to the plant bins.

At Eureka, South Dakota, a new industry, the concrete block plant of Art Schmitt, has been opened recently. The firm began working on an order for 10,000 blocks.

Prompt Delivery

ON BOTH STANDARD TYPES

— on **STEELGRIP** Steel Lacing that is applied with a hammer. 11 sizes — convenient boxes or long lengths for wide belts. Have 2-piece hinged rocker pins.

—on **WIREGRIP** Belt Hooks that are applied with any lacing machine and come with extra blue aligning cards (patented) that assure uniform tension on every hook and prevent card-end waste.

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FOR CONCRETE PIPE

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 30 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.

Quinn Heavy Duty Pipe Forms

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for any diameter pipe from 12 to 84 inches—tongue and groove or bell-end pipe at lowest cost.

WRITE TODAY

Complete information, prices and estimates sent on request. Also manufacturers of Quinn Concrete Pipe Machines.

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America's Finest Molds and Lowering Device

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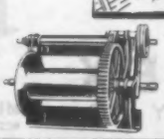

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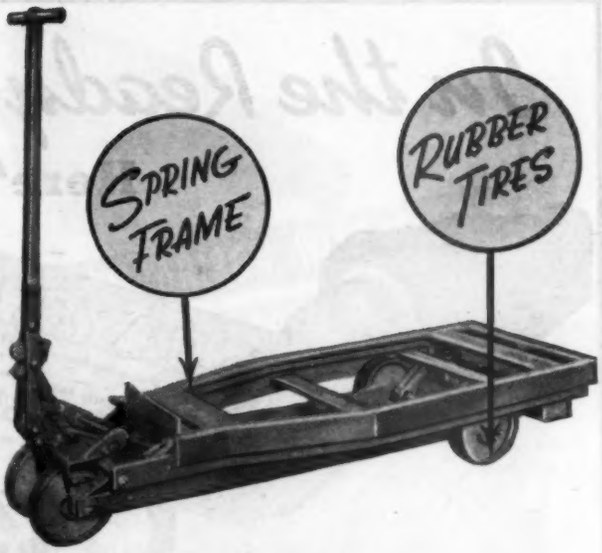

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FOR CONCRETE BLOCKS!

From machine to curing room and right through storage, the handling of blocks is a "soft" job with Barrett Lift-trucks. Breakage is eliminated by the shock-reducing rubber tires and super spring frame. The load is *raised* with a single downward sweep of the handle . . . *lowered* gently under control of a hydraulic check. Make a "soft" job of handling concrete blocks. See a Barrett engineer . . . or write for descriptive circular.

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48 Blocks at a Time!

With a Barrett, one man handles 48 standard concrete blocks 8" x 8" x 16" (or 32 of the 8" x 12" x 16" size).

Want electric drive?

THE POWEROX *has it!*

Cuts handling time and effort to an absolute minimum. Hand lift—electric drive, push-button controlled. Automatic brake, dual motors, rear wheel drive. PowerOx provides real economy without a large investment. Write for details today!

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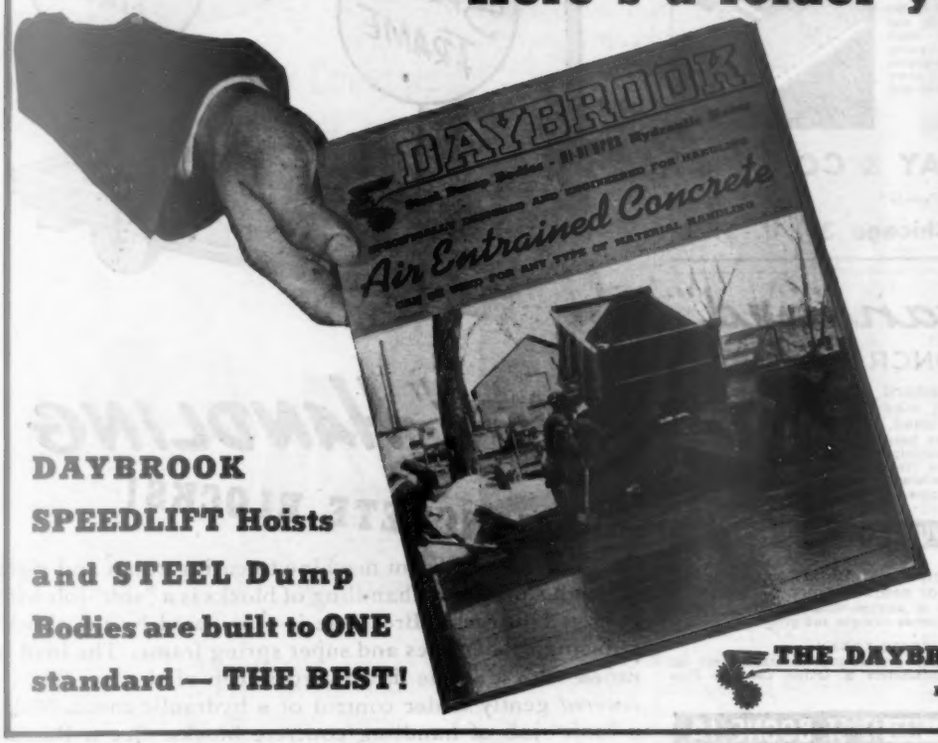
Barrett Handling Equipment

BARRETT

ONE MAN DOES MORE THAN 3 OR 4 . . . WITH A BARRETT

In the Ready-Mix Business?

Here's a folder you'll want—



HERE'S a dump unit that's specifically designed for handling Air Entrained Concrete; yet it can be used on any type of material handling job.

It's New and Modern—a unit that's built to put more money in your pocket. Write today for descriptive literature.

DAYBROOK SPEEDLIFT Hoists and STEEL Dump Bodies are built to ONE standard — THE BEST!

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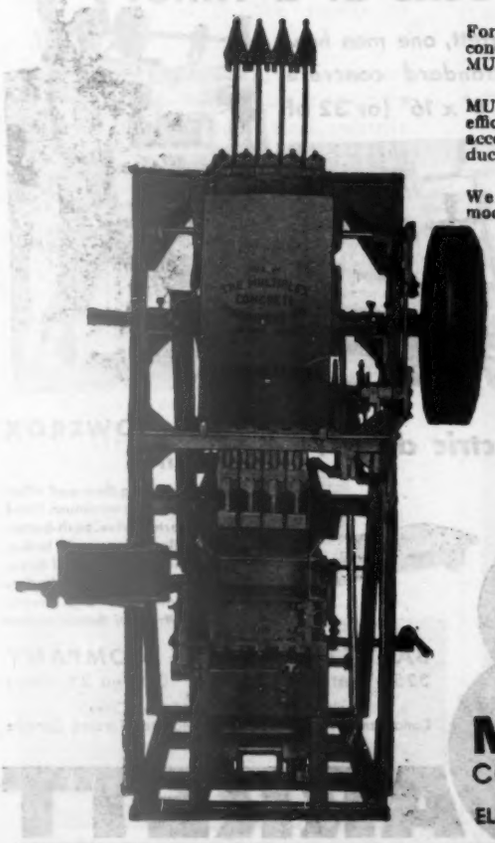
MULTIPLEX Machines For Postwar Profits



For a Quick "Take-Off" and sustained pace in concrete block output, reserve one of the MULTIPLEX *high-speed* machines.

MULTIPLEX offers a wide variety of super-efficient mixing equipment, with all types of accessories necessary for economical mass production.

We can recommend MULTIPLEX units for modernizing *your* plant and enlarging its capacity.

Our universal type MULTIPLEX Standard Tamper for making plain and stripper, or face blocks, on one base. Easily convertible as business expands. Supplied with 4-bar or 8-bar tamper, either power or hand operated.

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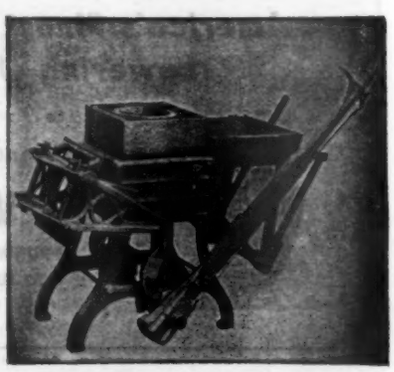
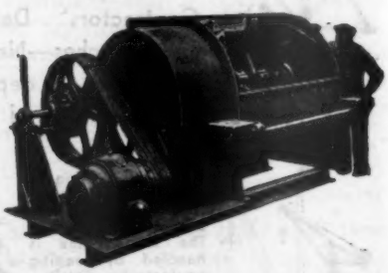


The MULTIPLEX Flue Block Machine makes ventilated, solid or lightweight units, including all attachments for ventilator and stove pipe openings.



MULTIPLEX Multi-Mixer with reverse screw-type action insures fast and thorough mixing of every batch. Side, end or bottom discharge.

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● Style 2167 Lift Truck Racks with steel decks in the block plant of the Currier Lumber Co., Detroit, Michigan.

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of cement and aggregates by agitators in material hoppers plus thoroughness of mixing insure perfect concrete blocks.

KENT

Continuous Mixer

KENT Two Hopper No. 2½ Mixer. Capacity, 8 cubic yards per hour.

Write for Bulletin

The KENT Mixer is an automatically operating precision machine that supplies a continuous stream of perfectly processed concrete. Just keep the hoppers full, and this unit will set a new production record and profit pace for your block machines. Requires no attention. Durably built for years of low cost service. Several sizes.

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3 CU. YD.

IN COMPARISON WITH JAEGER'S "SPEED MERCHANT," ANY OTHER TRUCK MIXER IS 5 YEARS OLD

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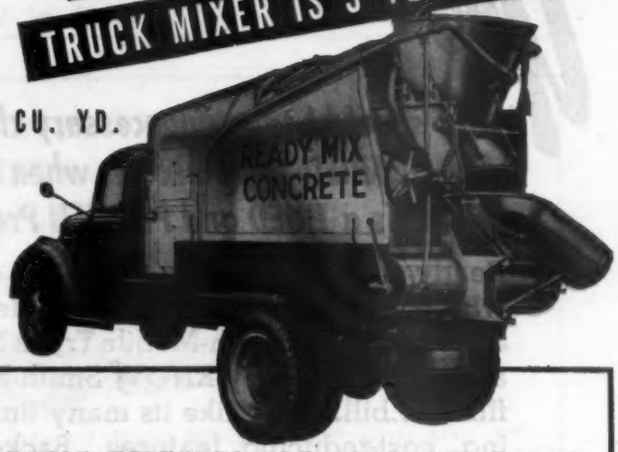

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"HI-DUMP" OR "LOW CHARGE": The improvements shown in these HI-DUMP models are also available in "LOW CHARGE" types up to 5½ cu. yd. sizes.

4½ CU. YD.

If you want the public to know that you intend to maintain up-to-date "ready-mixed" service in your community, the quickest way to tell them is to put one of these 1945-model Jaegers on the street. In appearance, in construction and in speed and efficiency of operation, they make previous truck mixer designs completely out-of-date. Talk to your Jaeger distributor or write us for new Catalog TM-5.

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Ready-mixed concrete operators everywhere are playing safe by using dependable, job-tested Smith-Mobile Truck Mixers and Agitators. They KNOW Smith-Mobile fills the bill. They like its many time-saving, cost-reducing features. Backed by almost a half-century of specialized mixer building experience, Smith-Mobile is now entering its 8th year of quantity production. Instead of periodically introducing "new models", Smith has always been committed to a policy of constant improvements and refinements. That's why Smith-Mobile is today the LAST WORD in truck mixer design. Get the facts! Ask for Catalog No. 198-C.

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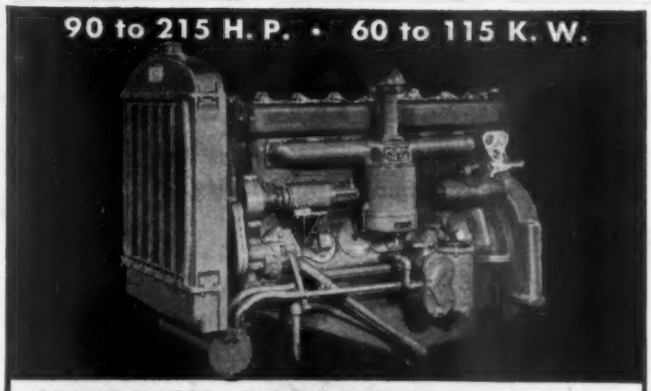

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Can Now Be Purchased Without Triple AAA Certificates or Priority

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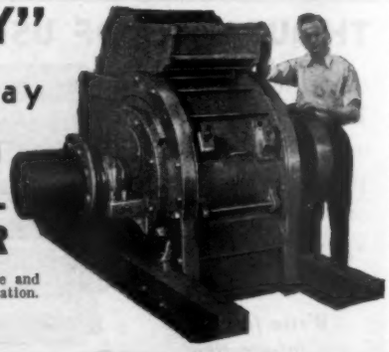

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8 1—Used Centrifugal Well Point Pump. 6" capacity. Powered with Waukesha gas engine. Location: Seattle, Washington.
9 1—Used Johnson 50 ton, two compartment Batch Bin No. 1HC204. Location: Seattle, Washington.
10 1—Used American Marsh 6" Pump. Serial No. C50276. Powered with Hercules Gas Engine. Location: Seattle, Washington.
11 1—Used RD6 Caterpillar Tractor. Serial No. 2H3294. Location: Omaha, Nebr.
12 1—Used LeTourneau Dozer for D6 tractor. No. R3438E6A. Location: Omaha, Nebr.
13 1—Used LeTourneau PCU—1 drum for D6 Caterpillar No. T8928AN6. Location: Omaha, Nebr.
14 1—Used 300 Amp. Westinghouse Welder No. 1885W604. Location: Grand Island, Nebr.
15 1—Used 200 Amp. General Electric Welder. Serial No. 1698658. Location: Grand Island, Nebr.
16 1—Used Model 460 2¼ cu. yd. Owen Clamshell Bucket. No. 5692. Location: Grand Island, Nebr.
17 1—Used Model HS-54 Etnyre Distributor 850 gal. semi. No. 1402. Location: Seattle, Wash.
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19 1—Used LaPlant Choate Rooter Model RP82. Location: Chariton, Iowa.
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21 3—Used LeTourneau Model R8C PCU Nos. P18447, P18363, P17488. Location: Grand Island, Nebr.
22 1—Used P & H Excavator. Capacity 6½' x 24" width. Wheel type mounted on half trucks, powered with 4 cyl., 40 h.p. Buda gas engine. Location: Western, Iowa.
23 1—Rex 34E Duomatic paver complete with 6 cylinder gasoline engine. Rex mechanical man, 35 ft. distributing boom and bucket.
24 2—Model W LeTourneau Carryall Scrapers, Serial Nos. S5958 and S5961. Location: Northwest Coast.
25 3—Model Super "C" Tournapulls, Serial Nos. 3T2652C1E, CT2258C1B, 3T26531C1E. Location: Oregon.

FUCHS MACHINERY & SUPPLY COMPANY, Omaha, Nebraska
New, Used & Rental Equipment
Jackson at 15th Street **At. 7050**

BELT CONVEYORS AND PARTS

250' 36" trough belt conveyor
1000' 30" trough belt conveyors
150' 24" trough belt conveyors
175' 20" trough belt conveyor
20" Portable trough belt conveyor, 27'6"
1500' 48" x 8 Ply prewar conveyor belt
500' 30" x 6 Ply prewar conveyor belt
New and used conveyor belt
Steel rib Jeffrey conveyor, 42"x160'
Steel plate feeder, 47"x30', smooth top
Scraper conveyor, 16"x42', steel trough-frame
Robins Automatic Belt Feeders, 14", 18", 24"
Robins hand operated trippers for 20" belt
Merrick Weightometers for 20" and 30" belt
Screw and gravity conveyors

BUCKET ELEVATORS, CHAIN, PARTS

12" bucket elevator on chain, 35 to 60'
10" bucket elevator on chain, 35'
8" bucket elevators on chain or belt, 30' to 50'
6" bucket elevator on belt, 25'
5" bucket elevator on chain, 25'
Encased and open bucket elevators
Grain elevators 5" to 18" buckets, on belt
14" cont. steel bucket elevator on belt, 45'
14" cont. steel bucket elevator on chain, 50'
Elevator chain with attachments: C131, C102½, 825, 847.
Conveyor chain: #114, 124, 730, 2706, 114, H78
New and used roller chains and sprockets

VIBRATING AND REVOLVING SCREENS

A-C double deck vibr. 4'x10' screen, 7½ HP motor
A-C double deck vibr. 3'x8' screen, 5 HP motor
Robins GYREX double deck 4'x10' vibr. screen
Simplicity three deck 3'x6' vib. screen
Leahy single deck 4'x9' screen, 2 vibrators
Deister single deck 5'x5' vibr. screen
Perfex single deck 4'x7'6" vibr. screen
3 Hummer single deck 3'x5' vibr. screens
2 Hummer single deck 4'x5' vibr. screens
Tyler 15 cycle generators for Hummer screens
Revolving screens: 4'x22' and 6'x20'
Revolving 30" conical screens

CRUSHERS, ROLLS, MILLS

Cedar Rapids 15"x24" jaw crusher
Acme 12"x22" jaw crusher
New England 11"x20½" jaw crusher
Buchanan 10"x16" jaw crusher, with elevator
Wheeling #2½ jaw crusher, 9"x15"
Heavy duty 9"x16" jaw crusher
Traylor BULLDOG 11" gyratory crusher
A-C #3D gyratory for fine crushing
A-C type B 42"x16" crushing rolls
Sturtevant Mill #0 Rotary Fine Crusher
Simplex hammermill coal pulverizer
L-B 24"x24" Single Roll Spring Relief Coal crusher
Robins 28"x30" double rolls, corr. coke crusher
Gruendler No. 16-40 Peerless Grinder
American Standard 24" disintegrator

MISCELLANEOUS

1 Williams 2 yard Rehandling clamshell bucket
1 Hayward 1½ yard Rehandling clamshell bucket
5 Dings magnetic pulleys, 18 & 30" faces, 30" dia.
Chicago NSB 14"x12" air compressor, 529CFM
Chicago NSB 7½"x6" air compressor, 107CFM
Gardner-Denver duplex 6"x6" air compressor
Two speed reducers: 60-1 and 70-1 ratio
National double drum 25 HP electric hoist
M-M single drum and swinger 25 HP electric hoist
Gasoline locomotives 36" gauge, 4 and 8 tons
Six 36" gauge V side dump cars
¾ yard and 2 yard 24" gauge V side dump cars
Waukesha 4 cyl. engine with 14-1 ratio speed reducer
Waukesha 4 cyl. engine with clutch, 35 HP
Worthington 25 HP electric pump, 750 gpm, 90' head
Goulds centr. pump, 4"x3", 200 gpm, 130' head
400 HP V belt drive double pulleys
Electric motors, gasoline and oil engines
6" centr. pump, 25 hp electric, vertical

G. A. UNVERZAGT & SONS
136 Coit Street **Irvington, New Jersey**

FOR SALE OR RENT

1—P & H Model 650 Diesel operated dragline. New 1937 equipment with 50 ft. boom and flood lights. Powered by Caterpillar D-13000 engine. Will handle 1½ yd. bucket. Location Omaha — shipment immediately.

ATLANTIC EQUIPMENT COMPANY
Broad Street Station Bldg.
Philadelphia 3, Pa.
Rittenhouse 8583

Royal E. Burnham

Attorney at Law

Patent and Trade-Mark Causes

511 Eleventh Street, N. W.
WASHINGTON, D. C.

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C. for sale at attractive prices. New and Rebuilt. All fully Guaranteed. Send us your inquiries.

V. M. NUSSBAUM & CO., Fort Wayne, Ind.

WANTED

A source of supply of Calcium Oxide (Quicklime) that will meet the following specification:

Arsenic (As_2O_3) .....Less than 1 ppm
Lead (Pb) .....Less than 1 ppm
Iron (Fe) .....Less than 500 ppm
Fluorine .....Less than 40 ppm
Magnesium Oxide .....Less than ½%
Insoluble in HCl .....Less than ½%

If you have an article that can meet the above specification, address your reply to Box 809, stating your f.o.b. price, how packed, and any other pertinent data.

• • •

c/o Pit and Quarry
538 S. Clark St. Chicago 5, Ill.

WANTED

Operating foreman for limestone crushing and fine grinding plant located in the East, preferably one experienced in the operation of cement grinding plant.

Address Box 803, Pit and Quarry
538 S. Clark St. Chicago 5, Ill.

CORE DRILLING ANYWHERE

We look into the earth

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA.

SUPERINTENDENT WANTED

Portland cement manufacturer has opening for Plant Superintendent. Permanent Position with old established company. Our own people know of this ad. In replying give age, education, experience, salary requirements and references. Write Box 813.

c/o Pit and Quarry
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WANTED

Manager for our Machinery and Equipment Department

Experienced with machinery and equipment used in heavy industries—like cranes, ground and overhead; steel buildings and structures, power plants, mining, contractors, etc. Drawing account and participation. Unusual opportunity for good high grade man. Confidences respected.

IRON & STEEL PRODUCTS, INC.
40 years' experience
13490 S. Brainard Avenue, Chicago 33, Illinois
"ANYTHING containing IRON or STEEL"

DRILLING CONTRACTORS
PROSPECTING, SAMPLING
BLAST HOLES & CLAY PITS

JUDD & SON
Martin City, (K. C.), Mo.

W A N T E D

Several excellent opportunities available in Middle West Portland Cement plant for Chemical Engineers and Veterans with Engineering training and experience. In reply give full information regarding education, experience and personal qualifications.

BOX 715, PIT AND QUARRY
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FAIRBANKS-MORSE

Diesel Power Unit
120 H.P. Model 35-E-8-¾, 450 RPM
Radiator, Clutch Power Takeoff
Heavy duty, Portable, Steel Skid Mounted
Rebuilt Stock Delivery

A. G. SCHOONMAKER COMPANY
50 Church St., New York 7, N. Y. Ph. Worth 2-0455

FEEDER WANTED

1—Heavy Duty electric vibrating grizzly type feeder, 2 vibrator units size 5 Jeffrey Traylor, or equal.

◆

THE NATIONAL LIME & STONE COMPANY
FINDLAY, OHIO

WANTED
PLANT SUPERINTENDENT

Familiar with pipe, block or any special concrete product. Must have at least high school education, be mechanically inclined and have pleasing personality. Age limit 48. Postwar opportunity with large concern branching out into full line of products in various sections of the United States and operating on an incentive profit sharing plan. Past record must stand rigid inspection. Include photograph in reply. Address Box 709, care of

•

Pit and Quarry Publications
538 S. Clark Street
Chicago 5, Illinois

WANTED

Good used 8 x 8 x 16" block machine. Describe condition, and tell where can be inspected.

Box 811, Pit & Quarry Publications
538 S. Clark Street, Chicago 5, Illinois

Wanted
DIESEL ENGINES

Total 1600 HP required, with or without Generators. Consider units 225 HP and larger. Also smaller high speed units for standby service. Preference given units immediately available. Give complete details and price.

Box 603
Pit & Quarry, 538 S. Clark, Chicago 5, Illinois

An unusual opportunity for Engineer

A large cement company in Middlewest needs high class Assistant Chief Engineer, who can do basic design work for engineering staff on machinery, structures and layout, and who can make time and cost studies on projected operations. Applicant preferably should have cement plant experience, but experience in allied operations will be considered. Advancement for right man assured. Apply for appointment by mail only, writing fully, including salary expected. Company provides insurance and has pension plan. Its personnel knows of this advertisement.

Address replies to Mr. S. A. Phillips, c/o Pit and Quarry Publications, 538 S. Clark St., Chicago, Ill.

WANTED

Equipment for complete rock plant with capacity of 100 to 125 tons per 8-hour day, ¾ rock and smaller. Also 2—Rotary Dryers approx. 4x40 ft. including 2 miles of conveyor or track cars and locomotive for hauling rock 2 miles. Will buy all or part of such a plant.

Lane Engineering Company
809 Woodland Avenue
Kansas City 6, Missouri
Tel. Victor 0018

SALESMAN WANTED

in Central N. Y. State by long established Distributors of well known Construction, Industrial and Highway Equipment. Liberal commissions. Sales ability, Automobile and knowledge of Machinery necessary. Excellent future in fine territory for capable man.

Box No. 705, Pit and Quarry Publications
538 S. Clark Street, Chicago 5, Illinois

WANTED

Large Reduction Crusher
5½ to 7 ft. Symons or equal.

•

Equipment Sales & Engineering Co.
Room 2000—33 N. La Salle St., Chicago

WANTED

Building that could be dismantled and re-erected, suitable for crane repair shop, about 50x80. Give full details, price, location. Send photograph if possible.

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SOUTH BEND SAND & GRAVEL CORPORATION
SOUTH BEND 19, INDIANA

WANTED

Trucks: 15 ton, rear dump, rock bodies, diesel, 4 wheel drive preferred.
Shovels: One 2½ yd. and one 1 yd. diesel, late model.
Locomotive: 25 to 30 tons, std. gauge, gas or diesel.

Box 805, Pit and Quarry
538 S. Clark St. Chicago 5, Illinois

ATLAS IMPERIAL

200 H.P. Power Unit
Model 6ES-668
6 cylinder, 514 RPM, Clutch
Heavy Steel Skid Mounted
Stock Delivery

A. G. SCHOONMAKER COMPANY
50 Church St., New York 7, N. Y. Ph. Worth 2-0455

WANTED

Engineer with experience designing stationary and portable gravel and quarry plants by mid-west manufacturer. Give detailed account of experience and salary expected.

Write Box 815
c/o Pit and Quarry
538 S. Clark St. Chicago 5, Ill.

SALES ENGINEER WANTED

Salesman with concrete and highway work experience wanted in northern Illinois to assume charge, in due course, of sand and gravel sales and development. Engineering experience desirable. Automobile furnished. Excellent future. Prefer man not over thirty-five. Attractive compensation. State experience—salary in mind.

Box 801, c/o PIT AND QUARRY
538 S. Clark Street, Chicago 5, Illinois

Construction Plant and Equipment From Shasta Dam, California

Available For Sale **Immediate Delivery**

CABLEWAYS AND HOISTS

3—Lidgerwood, 3-drum electric hoists with 500 H.P. G.E. Motors. Ward Leonard control, complete with controls and all electric equipment.

2—Lidgerwood, 3-drum electric hoists with 500 H.P. Westinghouse motors complete with controls and all electrical apparatus.

5—Cableway towers, structural steel, 3—125 ft.; 1—75 ft. and 1—45 ft., complete with travel mechanism.

6—Complete sets of carriages, main and auxiliary, fall and dump blocks, fall rope carriers, buttons, takeup bars and takeup sheaves.

1—American pillar crane. Cap. 5 T. at 48½ ft. and 15 T. at 25 ft. radius.

1—Colby elevator hoist, double drum, 75 H.P., equipped with brakes and emergency equipment including one hoist cage, 15 ton capacity.

1—1790 ft. pcs. of 3" dia. locked coil cable, new.

12,000 lin. ft. of used 3" dia. locked coil cable in length from 500 to 2600 lin. ft.

Misc. lot of sheaves, jewels, blocks, etc.

CEMENT PLANT

1—Dual #265 Fuller Fluxo cement pump, duplex type complete with gravity feed and automatic control equipment. 400 bbls. per hr. capacity. Pumping distance 3300 ft.

2—Fuller-Kinyon Pumps — type "D" 125 h.p. complete with air hose power control cable, control cabinets.

1—C-200 Fuller single stage rotary compressor Westinghouse motor 100 h.p.

CONVEYORS

66—motor operated gates for sand & gravel up to 6" cobbles with 1 h.p. Allis-Chalmers gear motor.

2—Complete sets, including 42" tandem drive pulleys, 42" head pulleys, 36" tail pulleys, 24" grubs, with Dodge Timken pillow blocks.

3—150 h.p. Westinghouse gear motors, 144 r.p.m., 2300 volts, 3-phase, 60 cycle.

1—Airplane tripper for 36" belt with two 17' wing belts, capacity 1,000 T per hour, complete with pulleys, drives and gear motors.

16—White Dump Trucks Model 1580-691, 24 cu. yd. capacity in good condition.

DRILLING EQUIPMENT

2—Mod. 315 I-R portable compressors, gas driven.

5—I-R paving breakers.

8—I-R drifters DA35.

2—I-R Wagondrills—pneu. tires, hoists, X71 drifters mounted.

1—I-R-54 Drill Sharpener.

10—I-R Jackhammers.

TANKS & RECEIVERS

10—8 cu. yd. steel hoppers including gates and air rams.

2—Water filters.

2—Wallace & Tiernan Chlorinators.

1—9500 bbl. all welded water tank, 48' dia., 30' high.

1—5400 bbl. all welded water tank, 36' dia., 30' high.

1—200 bbl. steel water tank.

10—Sandblast tanks 24" x 96" with hoppers and fittings.

10—Lubricator tanks 14" x 30"; 24" x 48"; and 24" x 60".

PUMPS

3—Bingham type SVD submersible pumps.

1—Byron-Jackson 150 h.p. 10 in. deep-well.

1—Gardner-Denver grout pump model FD-FS, 10" x 2½" x 10", with case-hardened liners and Calmex pistons and rods, 1,000 lb. pressure at 90 lb. air.

Other pumps complete with motors from 1½ h.p. to 200 h.p., also several I-R #25 sump pumps.

MIXING PLANTS

1—3000 cy. bin with 5 compartments for aggregates, 2 compartments cement, incl. turnhead, gates.

1—Complete set C. S. Johnson fully automatic batching equipment for 5 aggregates, cement and water for 4 cy. batchers.

5—4 cy. Koehring Concentric zone mixers, incl. batchmeters, timers, consistency meters.

1—100-ton steel bin.

MISCELLANEOUS

1—30" x 7' Bodinson reciprocating feeder.

1—G-D single drum air hoist.

1—PAX Automatic Telephone Switchboard with 76 phones.

1—Bodinson 60" x 16' trommel screen complete with motor drive, feed chutes.

Valves—1, 2, 3, 4, 6, 8, 10, 12, 16-inch.

10,000 ft. Type S rubber covered cable.

Pole line hardware.

Floodlites—500 to 1500 w.

1—1¼ cu. yd. Heavy Duty Clamshell bucket.

12—Muck Skips, 7—14 cu. yds.

50—Chicago Pneumatic concrete vibrators, Nos. 417, 518 and 519.

Several sizes of pneumatic wrenches, wood borers, chipping and riveting guns.

New and used rubber hose, ¾" to 4".

MACHINERY AND SUPPLIES

1—125 KW. motor generator set, 275 volts DC.

5—Blowers; American and Buffalo.

Complete stock of Warehouse supplies.

Complete line of transformers and electric motors.

ALL ITEMS SUBJECT TO PRIOR SALE

PACIFIC CONSTRUCTORS, INC.

GENERAL CONTRACTORS — BOX 898, REDDING, CALIFORNIA **Phone 512 REDDING**

FOR
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OF
RUBBER PRODUCTS

Conveyor Belting...Transmission Belting...Elevator Belting...Fire, Water, Air, Steam, Suction or Welding Hose, etc.

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CARLYLE
THE
RUBBER HEADQUARTERS

CARLYLE RUBBER PRODUCTS ARE NEW, GUARANTEED & LOW PRICED

CONVEYOR BELTING

ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"
42"	5	1/8"	1/16"
36"	6	1/8"	1/16"
30"	6	1/8"	1/16"
30"	5	1/8"	1/16"
24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
12"	4	1/16"	1/32"

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices - Mention Size and Lengths

ENDLESS "V" BELTS

"A" WIDTH All Sizes | "D" WIDTH All Sizes
"B" WIDTH All Sizes | "E" WIDTH All Sizes
"C" WIDTH All Sizes | Sold in Matched Sets

Inquire For Prices - Mention Size and Lengths

PROTECT THAT PLANT
FIRE HOSE

APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

SPECIAL OFFER . . . HEAVY DUTY
RUBBER HOSE

WATER HOSE
Each Length with Couplings Attached

I.D. Size	Length	Per Length
¾"	25 feet	$4.25
1"	50 "	8.00
	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

LARGER SIZES ALSO AVAILABLE
All Prices—Net—F.O.B. New York

CARLYLE RUBBER CO., INC.
62-66 PARK PLACE — NEW YORK, N. Y.

AVAILABLE WITHOUT PRIORITY

2—New 10" Superior McCully (Allis Chalmers) steel frame fine reduction gyratory crushers with 100 HP electric motors.
1—New 7" Newhouse (Allis Chalmers) fine reduction crusher with 60 HP electric motor.
1—New 72" diameter by 16' Allis Chalmers revolving screen with manganese steel sections.

A REAL BUY

Jaw crushers from 7x14 to 16x32 in stock.

ACME ROAD MACHINERY COMPANY
FRANKFORT, NEW YORK

EIMCO HEAVY DUTY BALL MILL

6'-6"x6'—NEW 1942
Used about six months

CRUSHERS

Webb City Jaw 12"x24"
Gruendler #2 Jaw, 10"x14"
American Ring Pulverizer #13 12"x12"
Symons Disc Crusher, size 24
Feed 3½"

ELECTRIC MOTORS

Rebuilt and Guaranteed
1½ HP to 200 HP

Immediate Shipment From Stock

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LOCOMOTIVES

1—80 ton Baldwin 0-6-0 separate tender switcher, built 1925, A.S.M.E. boiler, piston valves, Walschaertes valve gear, overhauled and up to date on all I.C.C. requirements.
1—79 ton American 0-6-0 separate tender switcher, built 1920, superheated boiler, piston valves, Walschaerts valve gear, rebuilt and brought up to date on all I.C.C. requirements.
1—26 ton American 0-4-0 saddle tank, standard gauge, A.S.M.E. boiler, entire new firebox, completely overhauled, coal burner.

1—20 ton Whitcomb diesel-mechanical 36" gauge locomotive, four wheel type. This locomotive built in 1936 and has had only light service. It is completely rebuilt with new wheels, chains, sprockets, reversing gear, and improved type bronze clutch plates. Caterpillar V-8 engine, 4 speeds each way, link-and-pin couplers.

1—Westinghouse 10½" locomotive type cross-compound air compressor, rebuilt, suitable for either locomotive or stationary installation.

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BIRMINGHAM RAIL & LOCOMOTIVE CO.
BIRMINGHAM 1, ALABAMA

FOR SALE

1—1 yd. Hoist, 2 drum, 2 speeds, Sauerman Crescent Bucket, Sauerman blocks, 400 ft. new ⅝" cable, 800 ft. ½" cable, price $1,000.
1—½ yd. Hoist, direct connected to 4 cylinder Hercules Engine on wheels, and ½ yard Sauerman Crescent Scraper, price $500.
1—Nelson Loader, price $500.
1—Knickerbocker 1 bag Concrete Mixer on solid rubber wheels, price $300.

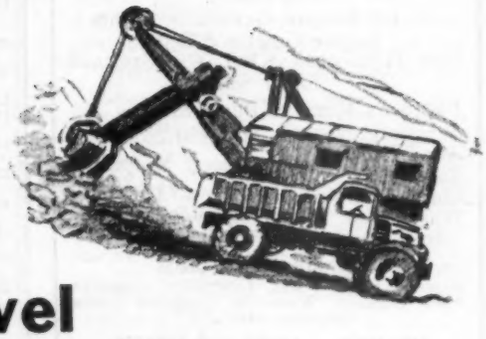
FRICKE SAND & GRAVEL
Dee Road, Park Ridge (Chicago Sub.) Ill.
Phone Park Ridge 1443 9:30 to 11:30 a. m.

CONCRETE PRODUCTS PLANT FOR SALE

Established in 1904. Complete in every way. Latest and best equipment for manufacturing concrete culvert pipe, block, drain tile, well curbing, etc. Ten acres of plant site; we own our own gravel tract and washing plant; good location; business well established; wonderful opportunity. Write for descriptive circular.

WETZSTEIN CONCRETE CO.
LAKE VIEW, IOWA

Buy Shovels Fit for Your Job



26 Yard Shovel

An exceptional opportunity for a large concern to obtain a 26 yd. Marion Electric Shovel in excellent condition with a 120' shovel boom, 86' dipper stick. The dipper bucket is 26 yds. For dragline work it has a dragline boom, which can be used up to 210' and it has a 20 yd. dragline bucket. The machine is ready for immediate shipment. Complete information will be supplied on request and arrangements for inspection will also be made.

1—15 yd. Bucyrus-Erie Electric Tower Excavator. Six miles high tension lines go with equipment.
1—7½ yd. Marion Electric Dragline — built in 1941—Model 7200. 110' Boom. One 7½ yd. and one 6 yd. dragline bucket. Electric controls. Substantial amount of spare parts.
1—4 yd. Electric Shovel—Ward Leonard Controls. Ideal for stripping operation. Marion make.
2—3 yd. Monighan Walker Draglines. Long booms. Good operating condition.
1—3 yd. Linkbelt Dragline and Shovel combination. 80' Boom. Three buckets.
1—Lorain 81—2 yd. Diesel Shovel and Dragline combination—in rebuilt and guaranteed. condition.
1—4 yd. Diesel P&H Model 900 Dragline. Condition real good.

½ YARD SHOVELS

1 Buckeye — 1 Byers — 1 Bearcat — 1 Speeder — 1 General — 1 Insley — 1 Northwest 2—1 P&H 204—1 P&H 300. Complete information on any of these machines will gladly be given on the telephone or will be sent by mail.

A REAL BUY!

Two—1¾ yd. Diesel Draglines with 34" wide and 17' long cats. $12,450 each—freight prepaid to any part of the United States. This is the best buy in the market and should not be missed.

1941—¾ yd. Lima Paymaster—An exceptional buy. Rebuilt and guaranteed shovel and dragline combination.

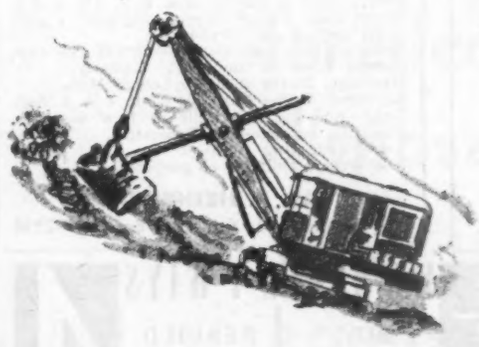
1—3 yd. Monighan—located Midwest—with a 70' Boom—Diesel Engine, also has electric motor. $14,000.
1—1½ yd. Diesel Osgood Shovel — Caterpillar D-13000 Diesel Engine.
1—1½ yd. Bucyrus-Erie 37B — rebuilt and guaranteed.
1—1½ yd. Koehring Dragline.
1—1½ yd. P&H Model 700B Dragline and Shovel Combination. Reasonably priced.
1—2 yd. Bucyrus-Erie Model E2 Dragline. Condition good.
1—1¾ yd. Bucyrus-Erie Dragline with 60' Boom—Atlas Diesel Engine.

¾ YARD SHOVELS

1 Bay City 16—1 Browning—1 Buckeye 1 Bucyrus 20—1 Byers 128—1 Koehring 301—1 Linkbelt Speeder—1 Lorain 40—1 Lorain 45—1 Marion—1 Northwest 3—1 Osgood—1 P&H 400—1 P&H 206—1 Bay City.

For complete information phone, wire or write.

ECONOMY CO., Inc.



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Tels.: MUrray Hill 4-2294, 4-2893, 4-2295, 4-2844, 4-2296, 4-8292

DIESEL POWER EQUIPMENT

43,945 Horsepower

FOR YOUR SELECTION
MODERN — IMMEDIATE DELIVERY

Complete Plants
10,800 H.P. Busch-Sulzer—9,000 KVA
—6 Units
1-3-4-6 Engine Generator Plants
Engine Generator Sets
1800 H.P.—1500 KVA Capacity and Small Sets

Fairbanks-Morse	Busch-Sulzer
Superior	McIntosh-Seymour
Atlas Imperial	General Motors
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Chicago Pneumatic	Ingersoll Rand
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PORTABLE POWER UNITS
International-Harvester Caterpillar Cummins
Buda Superior Waukesha Sheppard Lister
Murphy Hercules

IN STOCK — READY FOR SERVICE
Shops and Warehouse — Jersey City, N. J.
Specify Your Diesel Power Requirements

A. G. SCHOONMAKER COMPANY
Diesels
50 Church St. Phone Worth 2-0455
New York 7, N. Y.
Business Established 1898

P. & H. Shovel Model 33 with Wahesha motor.
P. & H. Truck Crane model 203, mounted on Mack truck.
50x24 Champion Jaw Crusher.
36x24 Farrel Jaw Crusher type 14B.
30x13 Farrel Jaw Crusher.
36x10 Farrel Jaw Crusher.
13A Telsmith Gyratory.
37½ Kennedy with 50 h.p. motor, built in flywheel.
Barber Greene bucket Loader on caterpillars with 4 cylinder Buda Gasoline motor, self starter, worm feed, like new.
Perfect discharge Elevator 30' center with 12"x7" buckets and Rex 111 chain, complete (no steel housing).
25' center Continuous discharge Elevator with 14"x9" steel buckets and channel iron frame.
45' center continuous discharge Elevator with 6" channel iron frame.
Lot of Elevator Buckets, all sizes.
150' center 36" Belt Conveyor with 8" channel iron frame, and speed reducer with or without belt.
160' center 30" Belt Conveyor with 6" channel iron frame with or without belt.
120' center 30" Belt Conveyor with 6" channel iron frame with or without belt.
165' center 24" Belt Conveyor with 6" channel iron frame with or without belt.
140' center 24" Belt Conveyor with 6" channel iron frame with or without belt.
80' center 24" Belt Conveyor with channel iron frame 6" with or without belt.
118' center 18" Belt Conveyor with 6" channel iron frame with or without belt.
80' center 18" Belt Conveyor with 6" channel iron frame with or without belt.
60' center 18" Belt Conveyor with 6" channel iron frame with or without belt.
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THE FOLLOWING SURPLUS EQUIPMENT IS IN GOOD CONDITION AND FOR SALE:

One 9-K Gates Allis Chalmers Crusher No. 5554, Complete with Allis Chalmers TexRope Drive.
A. C. Motor 200 HP, 900 RPM, 3 Phase, 60 Cycle, 440 Volt.
11 E-330 TexRopes 1½" x 1" x 330" Pitch Length.
Necessary Starting Equipment.

One 11 Groove Sheave 21.6" Dia. Motor Sheave

One 11 Groove Sheave 52" Dia. Face 19¾"

Special Crusher Parts.
One Bottom Shell Bushing
One Spider Cap
One Main Shaft (pre war nickle steel)
One Counter Shaft (with 52" Dia. 11 Groove Sheave)
One Counter Shaft Bearing Cap
One Eccentric (with mantle for rebabbiting)
One Spider Bushing
One Bevel Pinion
One Bevel Wheel

Two 10" Newhouse (Allis Chalmers) Crushers, Serial Nos. 8477 and No. 8520, Complete with 150 H.P. 3 Phase, 60 Cycle, 220 Volt, 575 RPM Allis Chalmers Motors.
Necessary Starting Equipment.

Spare Parts for 10" Newhouse
Two Main Shaft Nuts
Two Bottom Shell Bushings
Two New Eccentrics

Three 7" Newhouse (Allis Chalmers) Crushers, Serial Nos. 8524, 8480 and 8687, Complete with Two 100 H.P. 3 Phase, 60 Cycle, 220 Volts, Allis Chalmers Motors.
Necessary Starting Equipment.
One with 60 H.P. 3 Phase, 60 Cycle, 220 Volts Allis Chalmers Motors.

Three New Eccentrics
One Main Shaft Nut
Four Support Springs and Castings
Three Bottom Shell Bushings
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2—25 HP 440 volt 3 phase 25 cycle 720 RPM G. E. squirrel cage Type 1 Form K motors each 125.00
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New 1 HP 2 speed portable blowers for dust cleaning of electrical and other equipment $85.00.
3 KVA 440/220/110 volt 60 cycle GE oil type Transformer like new at $60.00.
3—5 KVA 3 phase 60 cycle 2300/220/440 cycle transformers $60.00 each.
2—15 HP 550 volt DC 825 GE type CVC motors, used, good shape, at $75.00 each.
10 KW 115 volt DC generator at $75.00.

DIESELS

H.P.	Engines	K.V.A.	Gen.	Year
1000	McIntosh-Seymour	1000	G.E.	1931
750	Superior	600	G.E.	1933
750	Enterprise	625	G.E.	1939
625	Worthington	622	West.	1933
500	Busch-Sulzer	437	G.E.	1920
400	McIntosh-Seymour	375	G.E.	1939
375	McIntosh-Seymour	372	G.E.	1938
375	Worthington (2)	425	West.	1933
360	Fairbanks-Morse "32"	300	S.M.	1932
330	Gen'l Motors (Winton)	282	G.E.	1937
330	Gen'l Motors (Winton)	282	West.	1937
262	Buckeye "E"	219	Ideal	1938
240	Buckeye "P"	187	Ideal	1932
190	Buckeye "70"	150	E.M.	1940
150	Buckeye "E"	100	G.E.	1937
125	Buda "L.D." (909) (2)	93	G.E.	1938
100	International	50	G.E.	1945
50	International	25	E.M.	1945

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50—Hopper, Side-Discharge, 50-Ton
10—Refrigerator, 40-Ft., 40-Ton
15—Express Refrigerator, 40-Ft., 40-Ton
10—Box, 40-Ft., 40-Ton
7—Box, Automoobile, Steel, 50-Ft., 50-Ton
2—Dump, Western, Automatic 30-Yd., 50-Ton; lift doors
2—Dump, Clark, 30-Yd., 50-Ton, drop doors
3—Dump, Western, 20-Yd., 40 and 50-Ton; lift doors
4—Dump, K&J, Lift-door, 37-Yd., 50-Ton
50—Gondola, 50-Ton, Low-Side, Composite
10—Tank, 8000 Gallon, 50-Ton

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1½ Ton—Twelve 1½ Ton 1941 **Chevrolet** Dump Trucks. New England.
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Four (4)—35 Caterpillar Tractors.
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One (1)—TD9 International Tractor.
Ten (10)—TD-40 International Tractors.
Three (3)—TD-35 International Tractors.
Two (2)—T-20 International Tractors.
One (1)—TKC International Tractor.

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Three (3)—HD-7 Allis-Chalmers Tractors.
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Two (2)—WK Allis-Chalmers Tractor with Baker Bulldozer.
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Five (5)—80 Cletrac Tractors.
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One (1)—40-30 Tractor and Bulldozer.
One (1)—35 Cletrac Tractor.
One (1)—BD Cletrac Tractor and Bulldozer.
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100	Westg.	vert.	2200	1160
100	G. E.	IM	2200	1800
100	Westg.	HF	440	230
75	Northw.	HW	220	1740
50	G. E.	MT	2200	1200
50	G. E.	MT	220	900
50	Westg.	HF	440	860
50	Al. Ch.	ARY	220	690
50	G. E.	MT	2200	600
40	Wagner	TBR	440	1725
40	Al. Ch.	ARY	220	1160
35	F. Morse	vert.	220	1800
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1 1937 2½ yard Rex.
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No reasonable offer refused.

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Marion 371, 1¾ yd. Shovel, Crane, Dragline
Lorain 60 Diesel 1 yd. shovel-crane
Buc.-Erie Model 14 elec. dragline, 3 yds.
P&H Model 600 crane and shovel
Marion Model 331 shovel, ⅝ yd.
Ohio 22½ ton Diesel loco. crane, std. gauge.
Buc.-Erie 20B Air tunnel shovel ⅞ yds.
Lorain 75B shovel and crane, 1½ yds.
P & H 650 shovel-crane
Browning 10 ton Truck Crane
P & H 203A, 8 ton Truck Crane
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SPECIALS!!

Allis-Chalmers cent. pump, electric, 3500 GPM, 50'
2 tons Drill Steel 1¼", shanked and bittered
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Rotary Screen 4'x18' with Bucket Elevator 40'
200-ton 2-compartment Steel Rock Bin

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⅞ yd. Hayward Clamshell, digging
Hayward ¾ yd. Standard Orange Peel
⅝ yd. Williams Clamshell, digging
⅝ yd. Haiss Clamshell, digging
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¾ yard Haiss Clamshell, rehandling
Erie ¾ yd. Clamshell, rehandling
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Allis-Chalmers Model K tractor with bulldozer
Int. TD40 tractor with bulldozer, rebuilt
Allis-Chalmers Model W8 tractor with 8 yd. hydraulic scraper
Allis-Chalmers Model L with bulldozer

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Roll Crushers, 54 by 20; 20 by 40; 30 by 24; 16 by 24; 16 by 42
Sturtevant No. 2 Ring Roll Mill
Gyratory Crushers: K.V.S. 30, 49; Traylor 8", 10", 12", 14"; McCully 13", 8", 6".
Jaw: 10x22, 10x24, 10x30, 11x18, 11x21, 12x22, 12x24, 14x24, 14x25, 15x32, 16x32, 16x38

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American 60 ton, steam, std. ga.
American 45 ton, Saddle Tank
Vulcan 25 ton side saddle tank, steam, std. gauge
Plymouth 30 ton standard gauge Saddle Tank
Vulcan 30 ton Steam, Saddle Tank
Porter 13 ton, Steam Saddle Tank, 36" gauge
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Vulcan 6 ton, 36" gauge, gas.
3—Western Steel 20 yard Air Dump Cars
3—30 ton Standard Gauge Flat Cars, rebuilt

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Two Cummins HBI-6 power units with radiator, 10V belt drive, clutch, 110 HP
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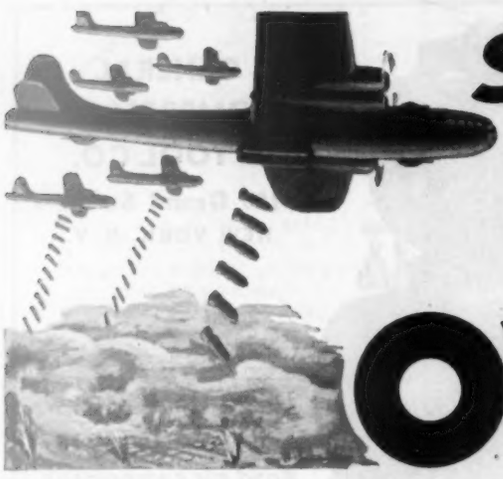
1-R 880 cfm. elec. air compressor
1-R 310 cfm. air compressor

RICHARD P. WALSH COMPANY
30 Church St. New York, N. Y.



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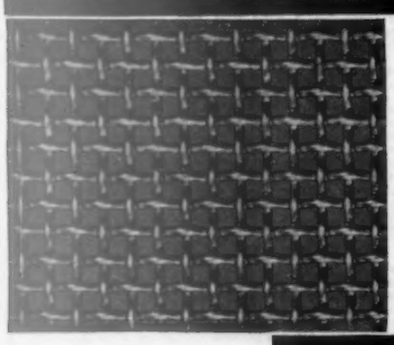
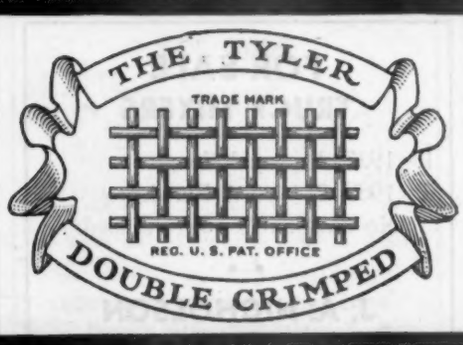
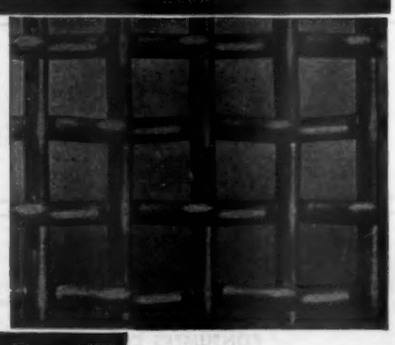
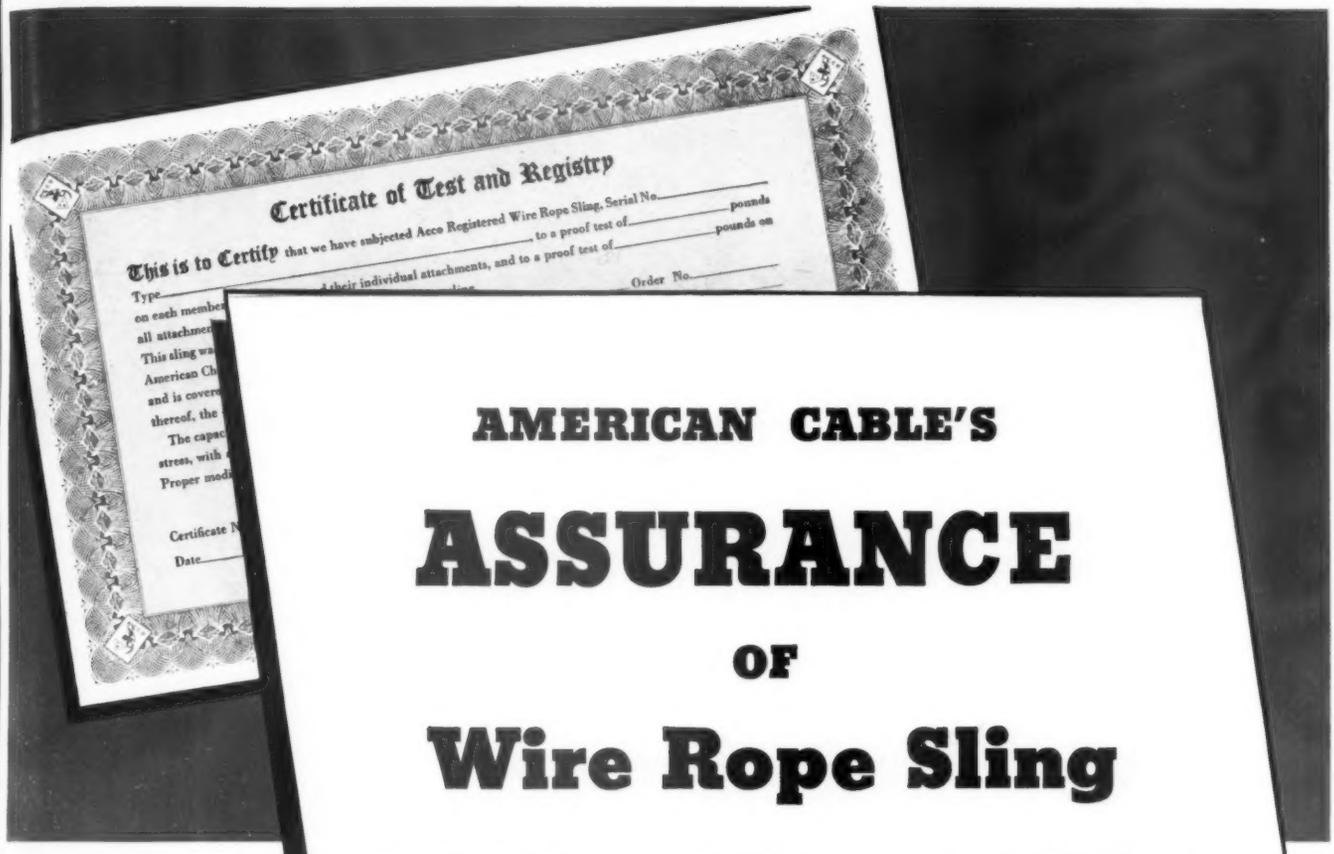






THE W. S. TYLER COMPANY, Cleveland 14, Ohio


Certificate of Test and Registry
This is to Certify that we have subjected Acco Registered Wire Rope Sling, Serial No.
to a proof test of pounds
to a proof test of pounds on
Order No.

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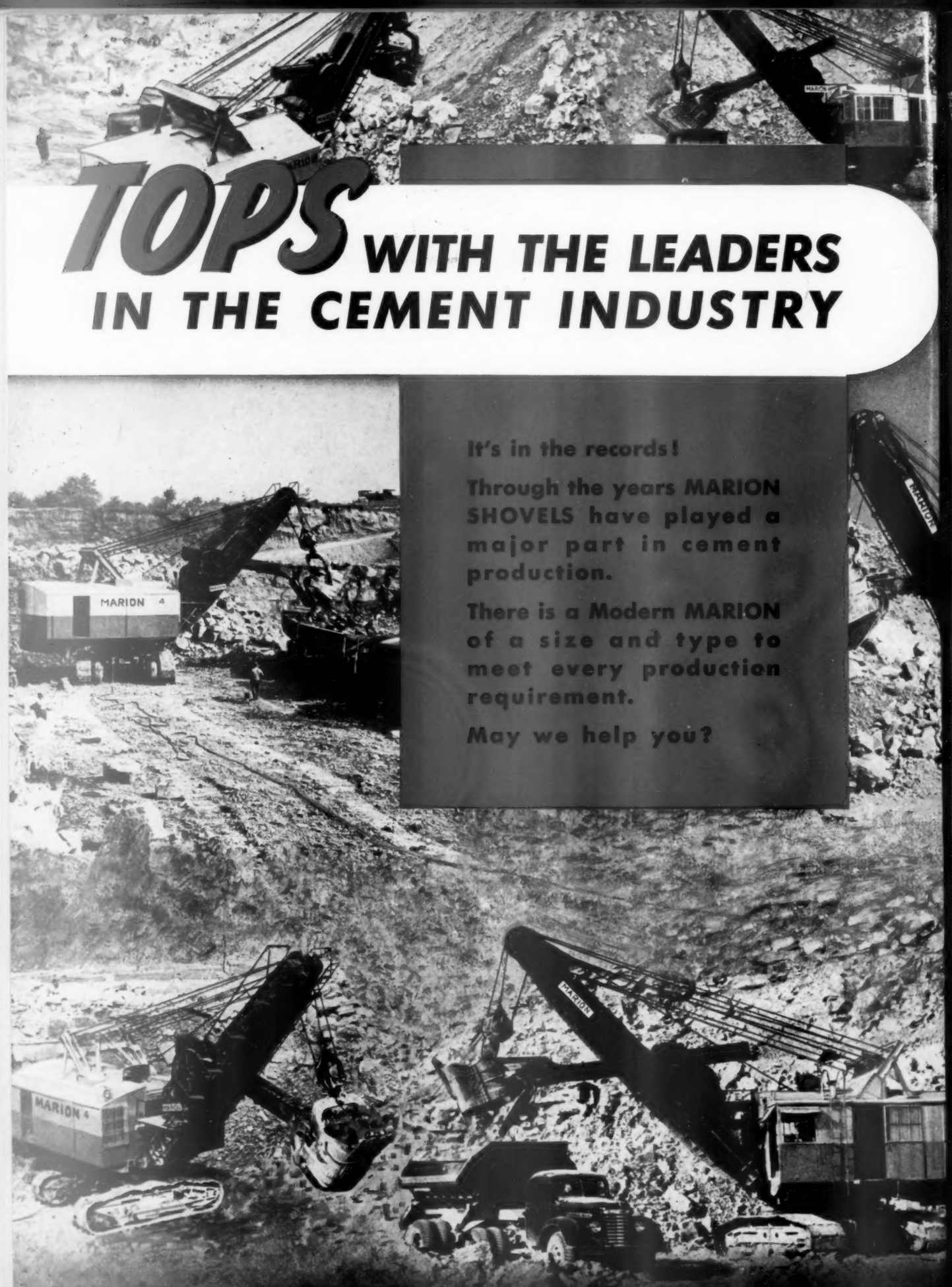

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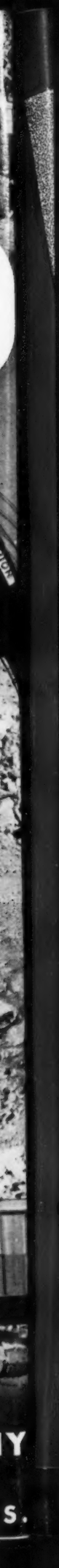
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